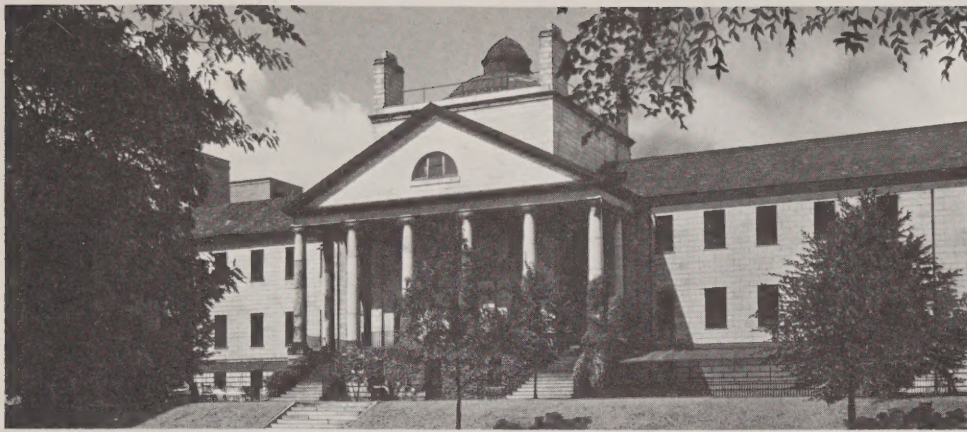




MGH News

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January-February, 1978

Controlling Arthritis: The Nation's Major Crippler

New Skills Broaden Prenatal Diagnosis

The mother of a retarded youngster came to the MGH apprehensive over the health of her unborn second child.

The first suffered from Down's syndrome, or mongolism. The disorder was caused by a shifting of part of a chromosome (strand of inheritance) onto another, thereby adding excess genetic material to the body of the second chromosome.

The mother's family history increased the risk of defects in her second pregnancy, but 14 weeks after conception she underwent an array of sophisticated tests at the MGH to learn whether abnormalities were redeveloping. An affirmative laboratory report could lead to immediate plans for special prenatal counseling and care.

The tests showed that, indeed, an-

other chromosomal shifting had taken place but that this time it was a "balanced translocation," resulting in no more and no less than the normal genetic material in the chromosomes.

The 28-year-old mother received assurance that her latest pregnancy was progressing well.

The MGH Prenatal Diagnostic Laboratory, since it opened last July 5, has conducted tests for more than 100 expectant mothers at risk for certain types of birth defects.

The tests provided the base upon which the fears of 97 of the first 100
(Continued on Page 2)

An airline mechanic told his company supervisor one day, "I just can't go on."

Swollen and excruciatingly painful joints in his hands prevented the employee from using the tools of his trade. Spreading to his knee joints, the painful condition also made walking almost impossible.

The affliction was rheumatoid arthritis.

Although only in his 40s, the mechanic left his job, applied for disability assistance, and became convinced that his working days were over.

He was wrong.

Persuaded to seek treatment at the MGH, the man at first was placed on a regimen of aspirin, the drug most commonly prescribed to reduce rheumatoid inflammation of the joints.

When the aspirin failed to help, gold salts, another old standby, were called into use. They produced a complete remission.

Back at his job, the patient has not suffered an arthritic pain since his treatment four years ago.

Is he cured? He would be deluding himself if he thought so. The effects of rheumatoid arthritis may suddenly subside only to return years later as painful and damaging as ever.

Arthritis is defined as an inflammatory disorder of connective tissue, the chief component of joints, but actually the disease embraces as many as 100 different conditions involving joints and connective tissue, and not all are characterized by inflammation.

In total, however, arthritis causes more prolonged physical misery to more people than any other disease. Although
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Looking at Teaching Hospitals Via the MGH

"The Teaching Hospital: Learning to Care" is the title of a one-hour documentary that will be telecast this winter in most large American cities. Filmed at the MGH, the documentary delves into the teaching hospital, explaining what it is and how it functions.

Although the camera roams over many areas of the MGH, the film concentrates on two general dramatic sequences: a life and death situation in the Emergency Ward and an open-heart operation on an 8-year-old boy. One major segment focuses on a young scientist's recovery from a form of cancer.

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Mrs. Pamela Vecchione, MGH physical therapist, treats John Lyons of Medford, Mass., following total replacement of his left knee joint injured by arthritis. The treatment is aimed at strengthening the knee and increasing its range of motion.



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The Inequities of News About Cancer

In recent years scientists have suspected that everything from certain brands of lollipops to some sources of drinking water "cause cancer." As the list of villains has grown, the public has begun to question the entire process. This growing public unrest culminated in the uproar over the Canadian study indicting saccharin. One can well sympathize with the public reaction. There is something drastically wrong with a system that spreads news with the same element of alarm about widely disparate degrees of danger. Some of the public wrath has descended on the scientist who makes the discovery. Another case of shooting the bearer of bad news. Part of the problem lies in the inadequate information now available about the origins of cancer.

It is becoming increasingly likely that many of the diseases called cancer often need a combination of factors to take hold in a given patient. That is to say, two persons exposed to the same amount of saccharin, cigarettes, or whatever, may react entirely differently. One may develop cancer relatively soon. The other may never succumb to it. In part, that difference may be caused by a varying inherited susceptibility. With cancer of the colon, genetics may be an important factor. Perhaps some additional element such as the type of diet may combine with genetics. Or maybe diet, genetics, or intestinal bacteria may singly or together interact with the large bowel and lead to the formation of cancer-causing agents and ultimately produce colon cancer. Thus, one might speculate endlessly about the stimuli for even one form of cancer. As the various kinds of the disease are considered, the potential combinations grow.

Besides the variables just considered, there is the probability that each "cancer causing" agent carries a different degree of risk to the population in general. Thus, while X amount of saccharin eaten over Y amount of time might provoke cancer in a certain number of people, perhaps only 1/1,000 of the same amount of another substance ingested in the same time frame might cause the same type of cancer to even more people. Animal tests providing this kind of information about the relative risk of various "cancer causing" agents are being improved. Yet research must devise more sophisticated procedures directly translatable to the degree of threat a given environmental substance presents to humans, not animals. Such an achievement will not come easily. When that stage is reached, the public will have the information needed to decide whether some risks in our environment are small enough to assume.

After all, we take varying degrees of risk in virtually every act of life. Merely going outdoors fills our lungs with pollutants which over a long period may cause disease. We knowingly increase that hazard by choosing to live in large cities or near factories which spew dense clouds of chemicals. With improved tests we should one day be able to rate health hazards much more accurately. Whether or not we as individuals then choose to govern our lives by such knowledge, we will at least have an intelligent choice.

Many Birth Risks Can Be Detected In Prenatal Tests

(Continued from Page 1)

women could be allayed.

In two of the situations in which abnormalities were discovered, the parents elected to terminate the pregnancies. In the third instance, the pregnancy continued with provision being made for the birth to take place in a major medical center where intensive pediatric care could be arranged.

The Prenatal Laboratory, a part of the Genetics Unit in the MGH Children's Service, offers aid primarily to two groups of expectant mothers: those over 35 years of age and those whose families have a history of abnormal births.

Although the first successful prenatal genetic diagnosis took place only a decade ago, now more than 100 different serious disorders are predictable before birth.

Dr. Richard W. Erbe, Chief of the Genetics Unit, said that among pregnant women in their early 20s, the risk of giving birth to a child with Down's syndrome is only 1 in 1,600, but by the age of 35 the odds narrow to 1 in 365.

"From then on," he said, "the risk increases sharply to 1 in 140 at age 39, 1 in 80 at age 41, and 1 in 50 at age 43."

Nearly three quarters of the first 100 patients sought tests because of their advanced maternal age. The oldest patient will be 47 at the time of delivery. Her risk for Down's syndrome is 1 in 15.

Using techniques such as "amniotic fluid cell cultures" or "alpha-fetoprotein assays," MGH physicians can detect not only a variety of chromosomal problems but also neural tube defects, involving faulty closure of the nervous system during development, and about 70 so-called Mendelian disorders.

The latter are part of some 2,000 disorders associated with principles of heredity formulated in the mid 1800s by an Austrian monk and naturalist, Gregor Mendel.

Photographs: Pages 1, 3 (lower), Myron Daniels; p. 3 (upper), Raymond Sprague; pp. 4, 5, courtesy of Arthritis Foundation; p. 6, Steven Rosenthal; p. 7, Karen Lawley; p. 8, courtesy of WCVB-TV.



Ultrasound tests of expectant mothers offer important data to physicians trying to discover any prenatal defects. Posing as patient in this photo is Miss Cara Penney, MGH student X-ray technologist.

One such abnormality is Tay-Sachs disease, chiefly affecting children of European Jewish ancestry. Reliable prenatal tests for the disease, which always results in death at an early age, became available only a few years ago.

The ability to detect neural tube defects by measuring the level of alpha-fetoprotein in amniotic fluid also came about in recent years. In the general population, the risk of such a defect is 1 in 500. For some unknown reason, people of Irish descent face a greater risk of producing a child with that problem.

To make a prenatal diagnosis, some of the "amniotic" fluid in the sac surrounding the fetus is removed by amniocentesis.

"This involves inserting a needle through the mother's abdominal wall into the uterine cavity and withdrawing about 20 milliliters, or a tablespoon and a half, of amniotic fluid," said Dr. Wayne A. Miller, an obstetrician and gynecologist who joined Dr. Erbe's Genetics Unit two years ago.

"Amniocentesis is usually performed between the 14th and 16th weeks of pregnancy because at this stage there is sufficient amniotic fluid to allow for safe withdrawal of the amount needed for testing and sufficient time to complete the indicated studies."

Sometimes the expectant mother visits the MGH gynecology clinic for the removal of the amniotic sample. At other times, it is obtained elsewhere and delivered to the Prenatal Diagnostic Laboratory.

To ensure absolute accuracy of the test results, Drs. Erbe and Miller strongly recommend that ultrasound examinations also be conducted for all of the women.

"One pregnancy in 80 leads to twin births," said Dr. Miller. "Since we base our test values on the number of fetuses present, we must know when multiple births are pending. Ultrasound answers the question safely by projecting an image of the fetus or fetuses on a television screen.

"Ultrasound also provides accurate dating of a pregnancy to within half a week. In contrast, estimates based on menstrual history and physical examination often differ from the true dates of the pregnancy by two or more weeks.

"Accurate dating is important to

some of the laboratory tests. Alpha-fetoprotein levels, for example, change dramatically from week to week in pregnancy. Some levels within the normal range at 14 weeks would definitely be abnormal at 17 or 18 weeks."

Drawing the amniotic fluid and taking the ultrasound test usually require 30 to 45 minutes. Conducting and evaluating the laboratory procedures, however, necessitate from three to five weeks.

All amniotic fluid samples are tested for two or three dozen major chromosomal abnormalities as well as for neural tube defects.

The chromosome analyses are performed in the MGH Cytogenetics Laboratory under the direction of Dr. Leonard Atkins of the Pathology Department.

"As for Mendelian disorders, each test to screen for a biochemical or metabolic disorder in the fetus is a complicated one requiring a large number of cells," Dr. Erbe pointed out. "We also have time limitations on how many tests can be applied to any given amniotic sample."

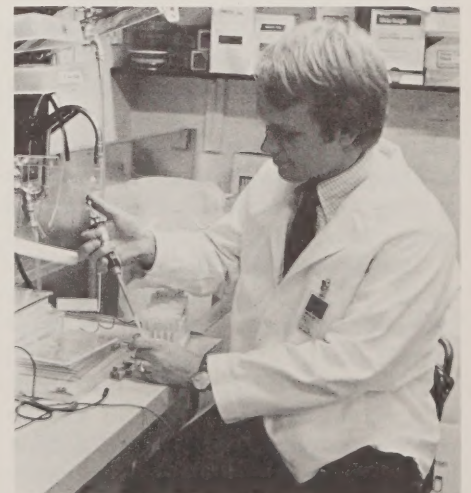
Examinations for these disorders are therefore restricted to the one such illness for which the patient may be at risk.

The MGH laboratory is one of a half dozen along the eastern seaboard which make available in one center a complete range of prenatal diagnostic services, including an ultrasound examination, the amniocentesis procedure, sample testing, and genetic counseling.

As a backup the MGH can call for prenatal diagnostic assistance from
(Concluded on Page 4)



Miss Susan Curran, Clinical Technician in the Prenatal Diagnostic Laboratory, checks the growth of amniotic fluid cell cultures in an incubator.



Using a process called "rocket-type immunoelectrophoresis," Dr. Wayne A. Miller measures the level of a substance (alpha-fetoprotein) in a sample of amniotic fluid.

Rheumatoid Arthritis Affects Many More Women Than Men

(Continued from Page 1)

not a killer such as heart disease, arthritis affects 50 million Americans — nearly one in four — 40 percent severely enough to require medical attention.

The annual cost from medical bills and lost wages in the United States alone totals \$4½ billion.

Most people develop some form of arthritis during their lifetime. X-ray studies of individuals over 60 years of age show evidence of arthritis in 97 percent of the tests.

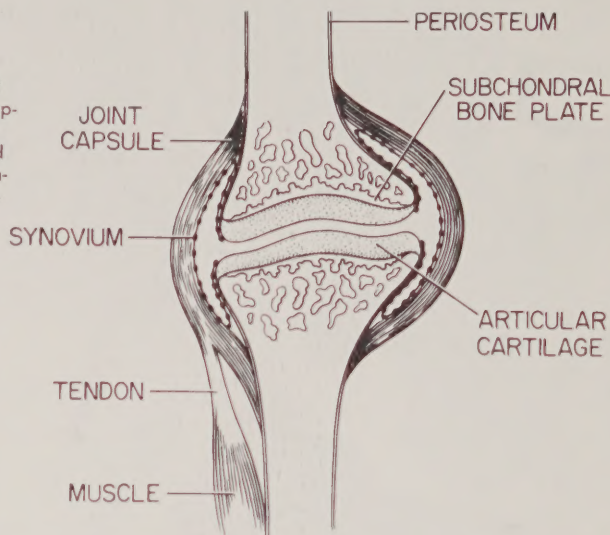
The most common form of the disease is osteoarthritis, basically a wear-away of the joints. Affecting 50 percent of all arthritis sufferers, it is generally noninflammatory and found most often in the older age groups. Usually mild, osteoarthritis nevertheless can lead to disability.

Dr. Stephen M. Krane, Director of the MGH Arthritis Unit, said that 30 percent of the arthritis population seen by rheumatologists falls into the category of rheumatoid or "rheumatoid-like" joint disease — the most serious, most painful, and most crippling form.

Inflammatory and chronic, rheumatoid arthritis can attack not only joints, leaving them disabled and deformed, but can also affect the body's organs, such as the heart and lungs, and cause disease in the blood vessels and muscles.

"Rheumatoid arthritis affects all age groups," said Dr. John A. Mills, a physician in the Arthritis Unit. "We

This sketch shows a normal knee joint with cartilage capping the end of each bone and the entire area encased in a fibrous capsule containing an inner synovial membrane. The membrane releases a fluid which nourishes and lubricates the joint.



see it in children only a few months old, and we see it appearing for the first time in octogenarians. The great majority are first stricken while in their 20s and 30s. Three times as many women are affected as men."

The incidence of juvenile rheumatoid arthritis is about one-tenth that of the disease in adults, but Dr. Mills said the problem is not any easier among children.

"Clinical information about the juvenile form has increased quite substantially in the last 10 years," he said, "but I'm not sure that our understanding of the disease has increased all that much."

The many other forms of arthritis, such as rheumatic fever, gout, systemic lupus erythematosus, bursitis, and ankylosing spondylitis (a spinal dis-

order), collectively account for the remaining 20 percent of those beset by the malady.

Although the condition dates to the earliest days of mankind, the cause and cure of arthritis continue to elude scientists. But a proper treatment program, faithfully carried out, can dramatically control the ailment.

A joint is not simply the coming together of two bones. A tough, smooth, elastic cartilage caps the end of each bone. Both the joint and cartilage are encased in a fibrous capsule which also contains an inner skin called the synovial membrane. The membrane releases a fluid which both nourishes and lubricates the joint tissue.

In rheumatoid arthritis, inflammation strikes first at the synovial tissue, causing it to thicken and grow. The cartilage is destroyed by the inflamed tissue and finally scar tissue forming between the bones turns to bone itself, making the joint rigid and immovable.

Reducing the inflammatory process and minimizing the anatomic changes that can lead to permanent disability are the physician's goals.

"Bed rest, often for as little as 30 minutes, can dramatically restore a feeling of well-being in a patient," said Dr. Mills, who is also an Associate Professor of Medicine at Harvard Medical School. "It has been amply demonstrated that if you put an inflamed joint to rest, the inflammation will disappear more quickly."

Meantime, drugs are employed against the inflammation. Aspirin leads the list, not only because of its anti-

Increasing Calls for Prenatal Screening

(Concluded from Page 3)

laboratories at the Eunice Kennedy Shriver Center in Waltham, Mass., and at Yale University School of Medicine in New Haven, Ct.

The affiliated facility at the Shriver Center originated at the MGH several years ago but moved to Waltham a few months later.

Before Dr. Erbe opened his lab in July, he and his staff spent four months conducting parallel studies with Yale to ascertain the accuracy and proficiency of the MGH operation.

"The women who contact us are concerned about several things," said Dr.

Erbe, who in addition to his MGH title is Assistant Professor of Pediatrics at Harvard Medical School. "They're worried about the health of the fetus and the psychological impact that an abnormal birth might have on others in the family.

"In addition, many who have reached their mid-30s fear the prospect of raising an ill child at a time when family finances are being spread thin by the cost of educating other children already in college.

"Since new techniques have made possible a wide range of prenatal diagnostic tests, we have found the demand for such services increasing steadily."

inflammatory capabilities but also because it is one of the safest medications available.

Gold salt or indomethacin might be considered next, or one of several newer non-steroidal anti-inflammatory agents. Physicians hesitate to resort to the corticosteroid drugs such as prednisone because although they are often capable of providing quick relief, they may also trigger dangerous side effects, particularly when used over a long period of time.

These may include mental problems, a softening of the bones, fluid retention, aggravation of diabetes, peptic ulcers, and increased susceptibility to infections.

"All of the drugs used to treat arthritis can produce other reactions," Dr. Mills pointed out. "One has to balance the potential severity of the side effects against the severity of the individual case and the degree of improvement that can be anticipated."

Once the inflammatory process is controlled, the physician tailors a physical therapy and exercise program to the patient. Bicycling and swimming are frequently recommended.

In recent years, surgery has brought new hope to thousands of arthritics whose condition had advanced beyond the help of conservative treatment.

The combined forces of engineering and medicine produced artificial joints of metal and plastic to replace the diseased areas.

Particularly successful have been total hip joint replacements. Some

75,000 such operations are now performed in the United States each year.

Dr. William H. Harris, Chief of the Hip and Implant Unit in the MGH Department of Orthopaedics, reported recently in the *New England Journal of Medicine* that after being followed for four to five years, 85 to 90 percent of patients who had total hip joint replacements still showed good to excellent results.

"The hip is completely or nearly completely free of pain," he said. "It has good although not normal motion, usually permits normal or near normal ambulation without a limp and without the use of support, and restores virtually full functional capacity for the normal activities of middle-aged and elderly adults."

Children severely incapacitated by arthritis of the hips are undergoing total hip replacements at an increasing rate. "Although it's too early to be sure," Dr. Mills said, "we have every reason to think that they'll get at least 15 to 20 years' use from the artificial joint before another is needed."

A multipronged program is underway at the MGH to strip away more of the mystery that surrounds arthritis and hopefully develop better methods of treatment.

David A. Swann, Ph.D., Director of the MGH-Shriners Burns Institute Connective Tissue Biochemistry Laboratory, is probing the basic mechanisms responsible for the lubrication of joint tissues by synovial fluid.

"There are always changes in the



In this arthritic hand, the joints have become both swollen and dislocated. Muscle deterioration also has developed.

composition of this fluid," he said. "By studying and comparing how it behaves in normal joints and misbehaves in diseased joints, we might learn how to stop things from going wrong."

Dr. Swann also is investigating the composition of the articular cartilage that caps the ends of bones. With detailed knowledge of the makeup of this tissue, it might be possible one day to construct substitutes for cartilage that has worn away.

Dr. Dwight R. Robinson of the MGH Arthritis Unit is studying the possible role of "prostaglandins" in the disease.

Prostaglandins are natural body substances which have widely varying effects in regulating such things as blood clotting, blood pressure, stomach acids, and some aspects of pregnancy. The importance of the hormone-like substances, of which about 50 types are known, has been appreciated only in the past decade.

"If you inject either one of two types of prostaglandins, called E-1 and E-2, into the skin of man or animals, you'll get an inflammatory reaction," Dr. Robinson remarked.

"We've been examining rheumatoid synovial tissue in our laboratory and have observed that it produces quite a lot of prostaglandin E-2 after being incubated in tissue culture.

"We found that we can inhibit this in the synovial tissue culture by adding aspirin, indomethacin, corticosteroids, or a variety of other anti-inflammatory drugs."

Surprisingly, in some research labs prostaglandins have turned out to be heroes, rather than villains, in the study of arthritis.

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The most common foot deformities in rheumatoid arthritis, shown here, are angulation of the great toe toward the other toes and a bending downward of the small toes.

Arthritis

(Concluded from Page 5)

Dr. Robinson said that investigators at another center studied a disease in mice that mimics systemic lupus and were able to delay or abort the illness with daily injections of prostaglandin E-1.

"In this particular disease state," he said, "rather than having an aggravated effect upon inflammation, the prostaglandin appeared to have had just the opposite reaction. We don't know the mechanisms that were responsible."

Although many scientists are conducting research into arthritis, Dr. Mills believes it will be some time before the pieces in the puzzle begin to fall into place.

"I'm not sure that any work now going on offers great promise of telling us the cause of rheumatoid arthritis," he commented, "but I think we're headed toward a better understanding of how joints become damaged and how the inflammatory process can be controlled. That can lead to improved treatment."

Arthritics Must Beware of Promised Cures

The very nature of arthritis — its exacerbations and sudden remissions — serves as an open invitation to the exploiter.

For every \$1 spent in the United States on legitimate research to find a cure for arthritis, more than \$15 is paid by sufferers of the disease to charlatans peddling worthless remedies.

These "remedies" take many forms, such as glamorized treatments, so-called secret formulas, or devices purported to have magical properties.

The fortune hunters who reap an estimated \$485 million annually find easy prey because arthritics enduring severe pain for weeks or months will grasp at any possibility of relief.

In advertising "cures," many quacks publish quotes from people claiming benefit from treatment. The patients may have offered the testimonials in complete sincerity.

Whatever treatment an individual takes in the weeks preceding the advent of a remission is bound to be credited by the patient with making him feel

better when actually the treatment and the remission may have had no connection whatever.

Years ago, a mining engineer's wife, long plagued by a form of arthritis in her arm, visited a uranium mine where her husband worked. On emerging, she discovered that she could swing her arm freely without pain.

Within weeks, arthritis sufferers were paying up to \$100 each for the privilege of traipsing through uranium mines.

Quacks still delude many people into thinking that copper bracelets offer relief from the pain of arthritis. One man who bought such a bracelet remarked, "It's ridiculous, I know. But I'm so desperate that I'll try anything."

While it may appear that many products and treatments do no harm except to bilk the purchaser, the fact is that the longer an arthritic delays adopting a program of appropriate medical treatment the longer he will be inviting misery from his ailment.

Providing On-the-Job Health Protection

What can be done to help people who are ill but either don't know it or don't believe it?

Millions of Americans go through life feeling fine while a "silent killer" irreparably damages the heart, blood vessels, or kidneys.

The disease is high blood pressure. Untreated, it can shave years from a person's life. With proper treatment,

the ailment can often be effectively controlled.

Screening for high blood pressure, or hypertension, is one of the most common diagnostic tests given in the United States. As a result, three-fourths of the Americans who have high blood pressure know about it. Yet of these people, an appalling percentage — two-thirds — either fail to seek or carry out

adequate treatment.

In an effort to help remedy this situation and to locate more people who unknowingly have hypertension, the MGH has launched an unusual, two-year, pilot program in the Greater Chelsea, Mass., area.

The project stresses the treating of workers right at their jobs.

The Esther A. and Joseph Klingenstein Fund, Inc., of New York, approved a \$10,000 grant to help underwrite the screening phase of the MGH program and, as part of its "Health Thyself" preventive care campaign, Blue Cross and Blue Shield of Massachusetts agreed to provide benefits for treatment given at selected work sites.

"Screenings are conducted everywhere," said Dr. Terrence A. O'Malley, who is medical director of the project based at the MGH-Chelsea Health Center, "but high blood pressure is an ailment without symptoms, and many people simply brush aside advice to seek help. If you tie the treatment to the work site, however, you can increase your effectiveness tremendously."

The project is believed the first ever geared toward providing such care in small plants. If successful, it should produce healthier people who require



Dr. Terrence A. O'Malley, medical director of the MGH-Chelsea Health Center hypertension program, looks on as Mrs. Thelma Tisdale, RN, checks the blood pressure of a worker at the American Finish and Chemical Company in Chelsea.



At left, Dr. Robert L. Trelstad, chairman of the subcommittee which arranged the MGH Research Symposium. At right, part of the audience in the Shriners Burns Institute auditorium listening to an address on a research project.

MGH Researchers Give Progress Reports

Within the MGH is a community of men and women whose daily activities draw little public notice.

Amid microscopes, glassware of all descriptions, and mechanical and electronic paraphernalia, these people press forward with research that frequently translates directly or indirectly into improved methods of patient care.

But even to many MGH personnel, much of the workaday world of the scientist is a constant enigma. Through a laboratory window, the contents of one test tube look no different from the contents of another in a room next door.

The passerby wonders, "What is going on?"

For the second consecutive year, the MGH Committee on Research, under the chairmanship of Dr. John T. Potts, Jr., has made it possible for

members of the MGH family and certain other invited guests not only to learn about scientific studies that are under way at the hospital but to receive progress reports as well.

On December 8 and 9, hundreds gathered in the auditorium of the MGH-affiliated Shriners Burns Institute for the 1977 MGH Research Symposium.

From nearly 160 scientific articles submitted by investigators, a special subcommittee of the Committee on Research deliberated long and hard to select 17 papers for personal presentation to the assemblage.

"We had two things to consider," said Dr. Robert L. Trelstad, an MGH pathologist who served as chairman of the subcommittee. "One was the quality of the scientific work being reported. The second dealt with diversi-

fication. Our selections had to represent a broad overview of what was going on in the hospital.

"This was by no means a competition. If one laboratory offered three excellent papers, we felt compelled to restrict acceptance to only one."

In addition, some laboratories which participated in the 1976 program received low priority consideration for the second symposium so that other areas of the hospital could be heard from for the first time. In no case, though, was a paper considered unless the quality was excellent.

"As in 1976," Dr. Trelstad said, "the nearly 160 papers submitted were of such quality that we would have had no difficulty choosing 100."

As it turned out, the 17 final selections in 1977 represented 15 different units or services within the MGH.

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less hospitalization and save money on health care.

The program began at the American Finish and Chemical Company in Chelsea. The adhesives manufacturing firm has a work force of 65. Assisted greatly by Blue Cross and Blue Shield of Massachusetts, the MGH also arranged participation by seven other companies with staffs ranging up to 200 people. Additional firms are expected to participate as the project develops.

The value of on-the-job aid in a large setting was demonstrated several years ago in New York when Cornell University Medical School screened most of the 14,000 union employees of the Gimbels Department Store chain.

Of those found to have hypertension, two-thirds, or 1,000 employees, accepted treatment at work. Others con-

sulted their private physicians or clinics of their choosing.

At the end of the first year, 96 percent of the workers receiving on-the-job medical attention were still active in the program. More than 80 percent of them had attained their blood pressure goals and were on maintenance therapy. Another 10 percent had achieved a significant reduction in their pressure.

The success of the continuing Gimbels model has been evidenced over the years by a decline in the number of employees hospitalized or disabled.

"We're trying to apply Cornell's work to small firms of between 50 and a few hundred employees," Dr. O'Malley said. "Greater Chelsea has about 10,000 people in that category.

"We hope to screen between 3,000

and 5,000 workers during the program's first year and develop work site treatment for the estimated 10 percent who have hypertension and do not use an alternative site for medical care."

An MGH team looks for people with blood pressure levels of 140/90 or higher. The larger number represents the systolic pressure, measured when the heart muscle contracts or beats. The smaller number is the diastolic reading, revealing the pressure when the heart is resting or between beats.

Those people whose readings are 140/90 or higher on at least two tests taken at two-week intervals will be placed in an "at risk" group.

"People in this group," Dr. O'Malley said, "are the ones we have to sit down with and suggest, 'Let's do something about this.'"

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Advisers Meet During Research Symposium

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They included the Arthritis, Biochemical Pharmacology, Cardiac, Diabetes, Endocrine, Gastrointestinal, Genetics, Infectious Disease, and Medical Oncology Units, as well as the Developmental Biology, Huntington, Renal Biophysics, and Special Clotting Laboratories; the Neurosurgical Service, and the Pathology Department.

"The range of papers covered everything from clinical science to very complex molecular biology, or basic science," said Dr. Trelstad. "We tried to touch as many bases as we could."

The 1977 Research Symposium, as the one the previous year, coincided with the annual meeting of the MGH Scientific Advisory Committee.

The MGH trustees appoint this committee to evaluate the health of the research effort under way at the hospital and at its affiliate, the Shriners Burns Institute, where the professionals also are members of the MGH staff.

"The panel may look at a hundred and one things," Dr. Trelstad remarked. "After proper study and discussion, the members report to the trustees on how the investigative work is progressing. Accompanying the report may be recommendations on what new work the hospital should undertake, as well as what it should not be doing."

To ensure absolute impartiality, all members of the Scientific Advisory Committee have always come from outside the MGH. A number of past members of the committee are Nobel laureates.

The present panel includes the President of Massachusetts Institute of Technology, Jerome B. Wiesner, Ph.D.

Traditionally, the board also includes a representative from Harvard University. Presently, he is Harold

Amos, Ph.D., Maude and Lillian Presley Professor of Microbiology and Molecular Genetics at Harvard Medical School. In the past the committee has numbered a foreign scientist among its members.

In addition to a review of laboratory studies, the committee's latest agenda included evaluating a report on the progress of the MGH Research Tutorial Program.

The project, which began only a few months ago, is designed to facilitate

training for people interested in doing basic scientific research in a health-related environment.

Although the Research Symposium was not tailored to the program of the Scientific Advisory Committee, the panel members have been very active participants during the discussion periods following the talks.

The authors of the scientific papers which could not be accepted for presentation at the symposium did not lose out entirely. These research projects were made available for review to those attending the lectures.

Learning to Care

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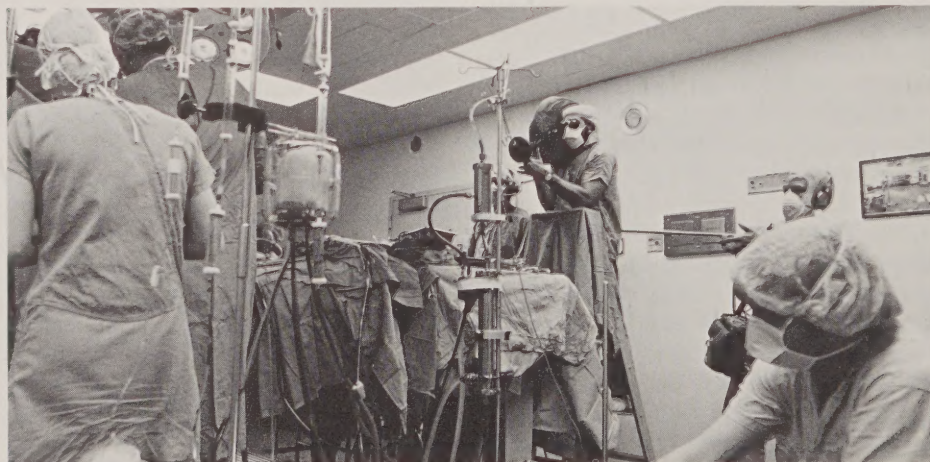
A portion on research attacks frankly some sensitive issues with such questions as whether basic studies are really important and whether research patients are taken advantage of. In another area Dr. Charles A. Sanders, General Director, states that medicine cannot go on providing every new treatment and test that comes along and that the public must ultimately help decide where to draw the line.

Throughout the hour there pervades a sense of how teaching strengthens patient care. Even though "Learning to

Care" centers on the MGH, its probing camera candidly relates the story of American teaching hospitals in general.

Channel 5 in Boston produced the syndicated film with Dr. G. Timothy Johnson, its Medical Editor, and with John B. Mullin, Producer, and Joan V. Aughton, Associate Producer.

While no date for the showing has been announced, present plans call for January or February in Boston and on a variety of dates and times in other major cities. Exact dates and times will be announced in the television pages of metropolitan newspapers across the country.





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Will Breast-Feeding Ease Acute Thyroid Illness?

AN ANALYSIS

Outbureaucratizing the Federal Government

What is hospital accreditation?

Accreditation is what a private and important professional group called the Joint Commission on Accreditation of Hospitals (J.C.A.H.) accords institutions that meet certain criteria. The concept is excellent.

In practice these criteria range from items relating to patient care to others having no bearing on the quality of care. Based on a periodic survey, the J.C.A.H. awards either a full accreditation for two years, a full accreditation for one year, or denies accreditation.

In providing either one- or two-year accreditation, the J.C.A.H. traditionally lists a number of items to be worked on before the next survey. A one-year accreditation means that because of the nature of the checklist the next inspection should come in one year instead of two. News media accounts conveying an unintentionally misleading impression have been criticized as erroneous by the J.C.A.H. Last May the J.C.A.H. wrote the MGH:

"After a review of the findings from your most recent survey (December 1976), the Board of Commissioners of the Joint Commission on Accreditation of Hospitals has awarded your hospital one-year accreditation. The Joint Commission on Accreditation of Hospitals commends your efforts toward providing patient care of quality."

Indeed the one-year accreditation awarded the MGH—like the two-year variety—is *full* accreditation. It in no way indicates that the quality of care

provided by the hospital has slipped one micrometer from that which has in recent years caused various groups of experts to rate the MGH number one in the country. (See box on page 2, column 2.) If anything, the hospital has improved care by consolidating expansion made in recent years.

Even Joseph Califano—who, as Secretary of Health, Education, and Welfare, has to preserve a certain measure of objectivity—was reported by
(Concluded on Page 2)

Each year in the United States hundreds of children are born with a thyroid disorder which can severely retard both physical and mental development.

Tragically, treatment of the disease called congenital hypothyroidism often begins after brain damage already has occurred.

Known in its most severe form as cretinism, hypothyroidism involves failure of the thyroid gland to produce enough hormones to control the body's growth and metabolism.

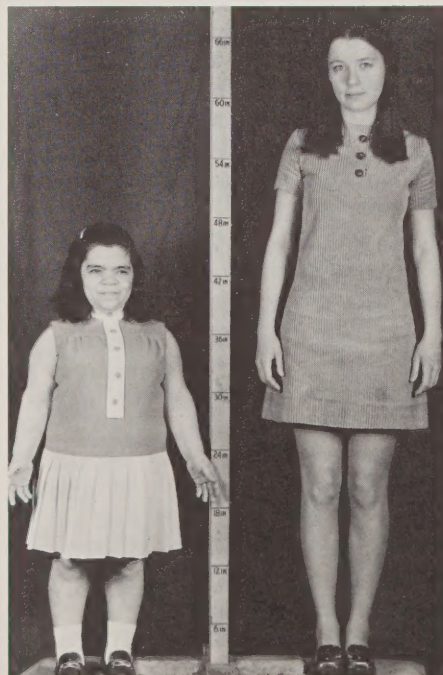
During the first several weeks of life, a baby with the ailment seldom exhibits any symptoms. In this same period the human brain normally develops at an enormously rapid rate. If the illness is not detected and treated by the time the baby is three months of age, irreversible harm to the brain is likely. Without treatment the damage increases in ensuing months.

Screening programs to discover metabolic disorders such as hypothyroidism in newborns are established in New England and a few other states, but in more than three quarters of this country such protection is unavailable on any formal, systemized basis.

Despite this, investigators in the Pediatric Endocrine Unit of the MGH and its neighboring affiliate, the Shriners Burns Institute, have noted the possibility of providing a measure of protection against hypothyroidism in another way—by breast-feeding.

"We have conducted studies which indicate that human breast milk contains sufficient thyroid hormone to lessen congenital hypothyroidism and possibly prevent impaired neurological

(Continued on Page 3)



Born with hypothyroidism, lady at left, who is 27 years old, stands alongside an MGH secretary.



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An Analysis

(Concluded from Page 1)

the Associated Press as saying this past November 16 in London, England that the Massachusetts General Hospital is "one of our best."

Why then did the J.C.A.H. decide to provide the MGH and a number of other prestigious hospitals with one-year full accreditation instead of two? The main thrust in the case of the MGH was that some buildings constructed as long ago as 1821 fail to conform to 1969 guidelines: matters such as the exact length of corridors and the precise size of glass windows on doors.

The code on which the J.C.A.H. bases its guidelines changes every three years. A hospital which spends, say \$30 or \$40 million to comply with the latest code, could find itself out of compliance three years later. And one aim of the code is to protect property. There is no scientific study which demonstrates that complying with the code significantly lowers risk to people.

While fires can occur in any structure, the MGH, built of brick and stone, has been fortunate never to experience a fatal fire in the 156 years in which it has treated many more than two million inpatients. This is a testimony to the care and dedication of its employees, to the solid buildings, and to the aforementioned good fortune.

In essence, the problem is the rapidly changing codes and even more significantly their rigid application. The crackdown by the J.C.A.H. follows a federal government complaint that the J.C.A.H. surveys were not stringent enough.

In its zeal to outbureaucratize the federal government, the J.C.A.H. has given one-year accreditation to 40 percent of the hospitals inspected during the past year. Among them are Johns Hopkins, the University of Chicago

Hospital, Walter Reed Army Hospital, the U.S. Naval Hospital, Boston Hospital for Women, Georgetown University Hospital, and Duke University Hospital.

The J.C.A.H. fails to take into consideration that these institutions are for the most part — like the MGH — housed in old buildings constructed long before the 1969 code was drawn.

Blindly applying the new codes may require huge sums, but after the expenditures, the hospitals still have the same old structures. The alternative — razing old and constructing new buildings — is prohibitively expensive.

The semiprofessional magazine *Medical World News*, reported on January 23 that Duke University Hospital expects to earn two-year accreditation in five years, after spending "at least \$92 million" for a new physical plant. Yet only after such massive expenditures could hospitals make alterations that might produce any impact on patient care rather than merely complying with what many regard as unreasonably enforced guidelines.

The excellence that experts credit to the MGH results from its quality of care and from its leadership in research and education. And although some of the buildings are old, highly skilled

"Finest General Hospital"

Town and Country, a national magazine established in 1846, surveyed 80 doctors in more than 40 medical schools and institutions to select the best health care centers in the nation. Among the 13 hospitals and medical centers chosen — and published in the February issue — was the MGH about which was added a unique commentary:

"Considered by many doctors to be the finest general hospital in the country." (In addition, eight MGH doctors got special mention.)

people work in them with the most effective modern equipment — often devices they themselves helped develop.

One factor never considered of significance by experts rating quality is whether the MGH offers luxurious new buildings. It does not, nor should it try to compete with the Waldorf-Astoria — unless such a change would make its patients get better faster.

Nevertheless, efforts to upgrade its physical plant should continue. One of the buildings cited by the J.C.A.H. as noncompliant — the historic Bulfinch — last July completed the move of its medical wards to the new Bigelow Tower, a change 10 years in the planning and execution.

Other alterations are contemplated. For 3½ years the MGH had struggled with the Commonwealth of Massachusetts for permission to replace the 74-year-old Ambulatory Care Division with a new building. Nowadays all such construction requires approval from the state's Certificate of Need process which until now has been interminable.

As a result hospitals are locked in a vise: On one side is the J.C.A.H. stating, "Your old buildings need major overhauling to conform to new safety codes." On the other side comes the squeeze from the states and their cumbersome Certificate of Need processes.

In the middle lie hospitals such as the MGH which would have to raise as much as \$44 million to make massive changes or \$10 million for only partial corrective measures. In neither instance can safety be guaranteed.

Is it really in the public interest to expend so much money on changes which make the buildings comply only temporarily but which fail to improve patient care? Either way, some extraordinary source of funding — not patient care receipts — would have to be found.

Another alternative is for the J.C.A.H. to be more flexible in enforcing codes, particularly in surveying older buildings. Hospitals constructed long before the various codes existed should be compelled only to take whatever steps are necessary to insure reasonable safety standards for their patients.

And the final alternative is for the J.C.A.H. to grant accreditation mainly on the basis of quality of care — and to weigh minor safety problems against the major costs that may be involved.

The Editor



At left, hypothyroid baby at eight weeks of age. At right, the same child 10 months later following treatment with thyroid hormone.

Breast Milk Furnishes Vital Hormone

(Continued from Page 1)
development," said Dr. Hans H. Bode, a pediatric endocrinologist at the MGH and at the Shriners.

"Our results, even though buttressed by another study, in no way guarantee that a baby with undiagnosed hypothyroidism will be spared from the disease's complications because of breast-feeding. Our belief, however, is that it will ultimately be proved that many such babies will benefit from mother's milk."

The studies were prompted by observation of a 12-month-old boy who was referred to Dr. John D. Crawford, Chief of the Endocrine-Metabolic Unit in the MGH Children's Service and Chief Pediatrician at Shriners, by Dr. John B. Joseph of Scituate, Mass.

Dr. Joseph diagnosed hypothyroidism in the child after the infant had been breast-fed during the first 10 months of his life and had grown at an above average rate.

As the baby was being weaned, Dr. Joseph noted the child developed a pallor, a yellowish hue to his skin, and a large tongue. His hemoglobin (the red substance in the blood that carries oxygen to the body's cells) was low and did not rise during six weeks' treatment with iron. At the same time, a decline in both growth and weight gain was evident. The thyroid gland could not be felt.

Subsequent examination showed that no thyroid tissue was present. The patient's bone age, determined from hand

and knee X rays, turned out to be that of a newborn.

Treated by Dr. Crawford with a hormone called L-thyroxine, the young patient's condition improved. He became more active, and his growth resumed. He began walking at 17 months, spoke a little at 18 months, and by 20 months was spoon-feeding himself.

At the age of 3½ years, the child appeared physically normal, albeit a bit clumsy at times. And, although formal testing had not been carried out, his mental faculties seemed fine.

In the studies on milk that followed, no thyroid hormones could be detected in pasteurized cow's milk or in three commercial infant formulas. The hormones were found, however, in samples of breast milk obtained from five donors.

Although the quantity of thyroxine present was less than desirable, it did appear ample to block the development of severe hypothyroidism in infants.

"There is no proof that the normal mental development of the infant referred to Dr. Crawford was due to breast-feeding," Dr. Bode said, "but recent data by Dr. Alfred Tenore and his colleagues at Children's Hospital in Philadelphia give strong support for such an assumption."

Dr. Tenore and his investigators reviewed data on breast- and bottle-fed hypothyroid infants seen in their clinic over the past 25 years.

"The breast-fed infants had greater

bone maturity at the time of diagnosis than formula-fed infants," said Dr. Bode, who like Dr. Crawford is an Associate Professor of Pediatrics at Harvard Medical School.

"In addition, those fed at the breast had attained 90 percent of the length expected for their age while the artificially fed group had achieved only 50 percent of expected growth.

"Even more striking was the difference in intellectual function. None of the 15 breast-fed infants had IQs lower than 95, while of the 32 receiving formula, 20 were below average in mentality."

The research by Dr. Bode, Dr. Crawford, and William J. Vanjonack, Ph.D., was conducted under grants from the Shriners Burns Institute and the National Institutes of Health.

The work has been presented in part before the Society of Pediatric Research in San Francisco and the American Academy of Pediatrics in New York. The latter's publication, *Pediatrics*, will soon report on the studies.

Dr. Bode has emphasized that there is no substitute to diagnosing hypothyroidism at birth and beginning treatment immediately, but he also feels that the benefits of breast-feeding should not be ignored.

Breast-feeding began to go out of fashion in the United States during the 1920s. By 1945, only 38 percent of infants in the United States were breast-fed. By 1955, the figure had fallen to 20 percent.

Since 1970, however, a trend back to natural feeding has developed.

"There has been increasing effort on the part of researchers to define the constituents of human breast milk," said Dr. W. Allan Walker, Chief of the MGH Pediatric Gastrointestinal and Nutrition Unit. "And with each step it has become more apparent that this is the ideal nutrient as well as protective substance for the newborn."

Dr. Walker, who is also an Associate Professor of Pediatrics at Harvard
(Concluded on Page 4)

Photographs in this issue courtesy of Dr. John D. Crawford, pp. 1, 3; Dr. John P. Remensnyder, pp. 4, 5 (lower); Dr. James W. May, Jr., p. 5 (upper); Dr. Joel J. Feldman, p. 6. Drawings on pp. 7, 8 courtesy of U. S. Department of Agriculture.

Many Bodily Faults Can Be Corrected By Plastic Surgery

When Dr. Hugo W. Moser became Assistant Superintendent of the Fernald State School in Waltham, Mass., 10 years ago, he set out to determine whether any of its residents had been misdiagnosed as retarded.

The undertaking by the then MGH staff neurologist led to a 12-year-old boy who was admitted during infancy as mentally deficient.

The youngster had a deadpan face, constantly stared, and drooled.

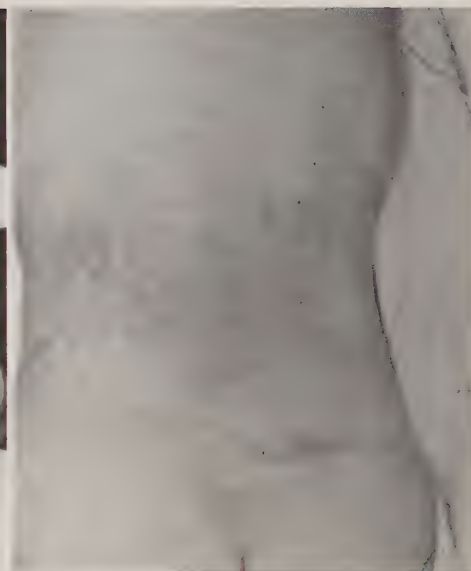
Dr. Moser discovered that the boy was not retarded but suffered from a rare physical malady called Moebius syndrome, which involves a lack of control of facial muscles. The MGH Plastic Surgical Division was asked to help.

"We did some reconstructive surgery to give expression to the boy's face," said Dr. John P. Remensnyder, Chief of the Division and also Chief of Reconstructive Surgery at the MGH-affiliated Shriners Burns Institute. "In addition we enabled him to control his lower lip so that he would no longer drool, and we corrected an eyelid that would not close."

The patient was enrolled in special classes and completed a 12-year educational program in just four years. Today



Baby, left, shown in 1970, had a giant pigmented birthmark (nevus) covering two-thirds of her back. At right is the same child six-and-a-half years later. The birthmark was removed in three stages using split thickness skin grafts from her buttocks.



a grown man, he resides in his own apartment in a community north of Boston and earns his own livelihood.

Dr. Moser, the physician who was so instrumental in altering the course of the patient's life, later became Superintendent of the Fernald School. Today he directs the John F. Kennedy Institute at Johns Hopkins Medical School in Baltimore.

Plastic surgery is often termed the "surgery of visual form and function." The plastic surgeon seeks to repair, rebuild, or improve parts of the body damaged by injury or disease, or left

defective because of poor growth development.

Years of special training in ways of transferring skin, bone, muscle, blood vessels, and other body structures enable him to do remarkable things. At the MGH his postmedical school training consists of an integrated program of four years of general surgery and an additional two of plastic surgery.

He may be summoned to repair such congenital abnormalities as cleft lips or palates. Accidents of all types, especially those resulting in acute burns, may demand his expertise. Surgery to remove some forms of cancer, particularly in the area of the head or neck, often must be followed by reconstructive plastic surgery.

The development of microvascular surgery—the ability to employ microscopes in special procedures to reconnect the tiniest veins, arteries, nerves, and tendons—has enabled plastic as well as other surgeons to reattach hundreds of severed fingers, hands, and arms (*MGH News*, May 1976).

Also falling into the realm of the plastic specialist is aesthetic, or so-called cosmetic, surgery to remove wrinkles, birthmarks, or skin growths, and generally to improve such parts of the body as the ears, eyelids, nose, breasts, or hands to provide a more youthful appearance.

Although aesthetic surgery represents only one phase of the program carried on by the staff of the MGH Plastic Surgical Division, the importance of this work is not minimized.

"We all engage in these types of pro-

Hypothyroidism

(Concluded from Page 3)

Medical School, said evidence suggests that breast milk facilitates the maturation of the intestinal tract so that it will work more efficiently.

Studies conducted by Dr. Walker and others show that human milk contains enormous numbers of leukocytes, white blood cells that can protect a baby against a wide range of infections. For example, infants seem to develop fewer allergies by consuming breast milk. The milk is sterile and always exactly right in temperature.

Dr. Walker is determining the feasibility of a mother's milk bank at the MGH to assure the biologic fluid for young infants, particularly premature babies.

"Certain precautions are necessary, however, to avoid contamination during collection and storage," he said. "For

example, freezing or pasteurizing milk will not only destroy any infectious agents in it but will also alter proteins that might be protective, and substances such as thyroid hormone.

"Ideally what we would like to do is store and refrigerate the milk for short periods. By using it fairly quickly, while fresh and cold but not frozen, we would be sure that the milk was at its best."

Stored breast milk generally must be used within two days.

Many babies are breast-fed today even though their mothers are away from home, working in an office or plant.

Dr. Walker explained that the more the breast is emptied the more milk is produced. The infant consumes only what it needs. As the mother's supply increases, she is in a position to extract an extra quantity which can then be stored in a refrigerator and fed later to the baby by somebody else in the household.

cedures to some extent," explained Dr. Remensnyder, "because it keeps us abreast of techniques that assure the finest, least visible scars possible. Without the challenge of cosmetic surgery, we might lapse into cruder methods during critical, reconstructive work and accept worse scars than necessary."

Misconceptions about plastic surgery abound. One of the most common implies that the doctor routinely uses some sort of synthetic material in his operation. The term "plastic" (derived from the Greek word "plastikos" and the Latin word "plasticus") simply means "capable of being molded."

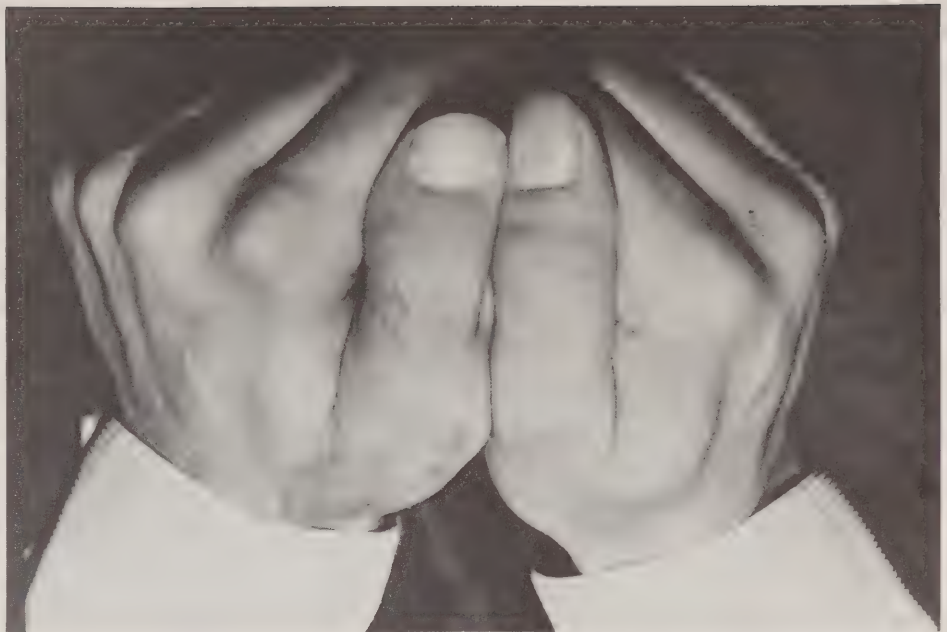
Some people think that plastic surgery embodies only aesthetic surgery. Others believe that every plastic surgical procedure involves a skin graft.

Because so much misinformation about this field prevails, careful measures are taken preoperatively to make certain that the patient does not expect more than the surgeon can deliver, realizes that all operations involve some degree of risk, and understands that the results are sometimes unavoidably temporary.

"The benefits of face-lifts and eyelid surgery, for example, may last only five to seven years," Dr. Remensnyder remarked. "This is because gravity continues to affect the facial skin."

"On the other hand, rhinoplasties [nose operations] are permanent because bone and cartilaginous structures are altered as well as the skin."

In situations where the victim of an accident is so disfigured that it is difficult to foresee much improvement, the patient's perception of himself be-



Do you see anything unusual about this photo? The thumb on the patient's left hand was once the big toe on his right foot. The replantation followed an electrical accident in which the patient lost his thumb and also suffered foot injuries.

comes the surgeon's guiding force.

"A person can deny a tremendous amount of reality," said Dr. Remensnyder, who is also Associate Professor of Surgery at Harvard Medical School. "We have found that many of the most disfigured patients possess a pretty good self-image. A little help along the right path can strengthen that."

Dr. Remensnyder told of a patient who suffered extensive facial disfigurement after falling into a caustic substance:

"Some four or five weeks after the accident, on looking into a mirror for the first time, he remarked, 'Gee, my mouth is a little crooked.' The only thing he could deal with at the con-

scious level was one minor deformity. Everything else was denied.

"As time passed and the patient accepted more and more of what had happened to him, we were able to treat each problem: the disfigurement from the deep burns on his nose, areas of his scalp, and eye involvement. His self-image was so important to him, and to us as well."

Frequently when the surgeons are unable to assess what the patient is thinking about himself, or suspect that he may be mentally disturbed, they will solicit psychiatric assistance.

Plastic surgery at the MGH began in the early 1920s with establishment of a clinic directed by Dr. Varaztad H. Kazanjian, later acclaimed internationally as one of the great pioneers of this branch of medicine.

A few years after graduating from Harvard Dental School in 1905, Dr. Kazanjian found his dental practice turning unexpectedly to the care of jaw fractures because hospital facilities were unavailable at the time for such treatment.

During World War I, while with the first Harvard unit to join the British Expeditionary Forces in France, he was served well by his experience in mending fractures. His unusual ability in prosthetic restoration enabled him to treat countless soldiers suffering from extensive mutilation of the bones and soft tissues of the face and jaws.

Dr. Kazanjian soon became known
(Concluded on Page 6)



Neglected form of skin cancer (basal cell carcinoma), shown at left, required surgical removal of entire lower eyelid. In right photo, patient has new eyelid formed by a combination of material from her nasal septum and a large rotation skin flap involving her whole cheek.

New Skin Flaps Aid Plastic Surgeons

(Concluded from Page 5)

as "The Miracle Man of the Western Front."

After returning to civilian life, he realized that in order to continue his highly specialized work he would have to fill a gap in his training. He entered Harvard Medical School and received an MD degree in 1921.

He already had taught at Harvard for many years, first at its Dental School, then at the Medical School. In 1941, he became Harvard's first Professor of Plastic Surgery.

The senior member of the present MGH plastic surgical team, Dr. Bradford Cannon, succeeded Dr. Kazanjian as head of this group in 1941. Dr. Cannon was formally named the first Chief of the Plastic Surgical Division in 1970 when the integrated training program was established. He served until 1973 when he, in turn, transferred the assignment to Dr. Remensnyder.

Dr. Cannon remains very active, operating regularly, going on rounds, and taking his turn at teaching residents. A man of international stature, his opinions are sought frequently to settle debates at national meetings in his field.

Dr. Remensnyder's primary interest is reconstructive surgery on children who have suffered burns. His unit operates both at the MGH and its neighboring affiliate, the Shriners Burns Institute.

Also of special interest to him is the care of children born with giant pigmented birthmarks (nevi) which may cover as much as 30 percent of the body. If not removed, they could degenerate into a form of cancer (malignant melanoma).

Other members of the MGH Plastic Surgical staff include:

Dr. John D. Constable, who is also Chief Plastic Consultant at the Shriners. His particular interest there is in facial burns. At the MGH he does all forms of reconstructive and aesthetic surgery and maintains a heavy teaching schedule. He has performed numerous breast reconstructions following mastectomies.

Dr. Michael B. Lewis, who is also Chief of the Plastic Unit at the Tufts-New England Medical Center in Boston. He has developed a very strong interest in the repair of congenital defects as well as skull and facial (craniofacial) deformities.

Dr. James W. May, Jr., recently ap-

pointed Chief of the Hand Service in the Plastic Division. His special expertise is microvascular surgery. He has established a laboratory to conduct microvascular research and to help train other professionals at the MGH who are interested in the technique.

Dr. Joel J. Feldman, who is also on the staff of the Mt. Auburn Hospital in Cambridge, Mass. According to Dr. Remensnyder, Dr. Feldman "has helped to develop the transfer of very large flaps to resurface badly burned faces in ways that we hadn't done before. It's one of the most exciting new things that has happened in reconstruction work in a long time."

A skin flap consists of a section of skin with underlying fat still attached. The flap is rotated to cover an adjacent wound. One edge of the flap is left attached to its original site to maintain blood supply to the tissue.

In facial burn resurfacing, the flaps are obtained from the unburned neck and chest in order that the color and texture will closely match normal facial skin. The flap is extremely thin to allow normal facial expression.

Dr. Feldman has also played a key role in the introduction of muscle-skin (myocutaneous) flaps.

"By transferring skin together with underlying muscle," Dr. Remensnyder explained, "we can repair defects in much shorter periods of time."

In the past, for example, open fractures of the shin bone (tibia) required several operations and a cross-leg flap. The patient's legs had to be crossed and held rigidly in a cast for six weeks or more.

Today, with a muscle-skin flap, merely one operation is needed, and the flap heals in only about 10 days. The resultant saving in hospital costs for the patient is considerable.

Each month the six-member plastic surgical staff attends some 300 private patients and supervises the treatment of about 130 nonprivate patients by the division's four residents. Dr. Matthias B. Donelan is Chief Resident, and Dr. Harvey M. Rosen is Senior Resident.

The value of plastic surgery to the patient depends heavily on his self-assessment.

"If the patient thinks that he'll look better," said Dr. Remensnyder, "then he'll also feel better. He'll become a more positive person, whatever his walk of life."



Open shin bone (tibia) fracture, left, is shown repaired, right, by a new technique involving use of a muscle-skin flap. The surgery replaces a series of operations and considerably shortens hospitalization, thus lessening cost to patients.

Emotions Wield Heavy Influence on Appetite

Author Cyril Connolly once wrote that "Imprisoned in every fat man, a thin one is wildly signaling to be let out."

What causes an individual to gorge himself with food to the point where he literally becomes trapped within himself?

Hunger is not the answer. One of the most powerful forces in man, hunger can gnaw at a stomach until it drives a person mad, but, with rare exceptions, food will quickly dispel the pangs.

Obesity, according to Dr. Thomas P. Hackett, MGH Chief of Psychiatry, is the most common condition associated with disturbances of appetite.

"Unlike hunger, which is physiological," Dr. Hackett said, "appetite is practically all emotion. It is acquired and builds as we come to prefer certain foods."

"Appetite determines intake and therefore accounts for the great disproportion in waistlines in every city and at every crossroads in our nation."

After consuming a large meal which bulges his stomach, a dinner guest may spot a fancy new dessert. His stomach may tell him that he has had enough, but his appetite may override his common sense.

One theory seeking to explain the urge to eat equates food with love. To infants, the mouth is the all-important organ. Babies explore the world by tasting, licking, and sucking. When weaned, they often suck their thumbs to replace the nipple.

In the normal process of develop-

ment, children become less preoccupied with their mouths and more interested in other body parts and the world around them. But, for a variety of reasons, many centering on the mother-



child relationship, some children maintain an active interest in the pleasures obtained through the mouth.

As these people grow older, the theory continues, this interest in the mouth becomes repressed until it comprises a portion of the subconscious, the part of the mind never known to man but which determines so many of his actions, decisions, and neurotic traits.

Thus the early association of food with mother love is retained. The intake of food continues to provide a pleasure and gratification that hearkens back to infancy.

"Often, obese people will claim that they eat very little," said Dr. Hackett, "and this may be true at mealtimes. But generally their pattern is one of constant eating or drinking through the day; candy bars, soft drinks, pastries consumed on the hour. It's as if they have to keep their mouths in motion all the time."

"Those physiological mechanisms that account for the control of food intake have gone awry. These people no longer know when they're hungry or satisfied. They eat for reasons other than to satisfy their hunger, such as for emotional reasons."

In an address to MGH dietary interns, Dr. Hackett, who is also Profes-

sor of Psychiatry at Harvard Medical School, emphasized that overweight people will seldom reduce for their health's sake alone.

"Whenever you put someone on a diet," he said, "remember that you are robbing him of something to eat; not that he needs it, but he still has the craving for it. An obese person may seek to lose weight to improve his image, to gain a sense of pride, or perhaps to make someone else like him more."

Some forms of obesity resist non-surgical treatment. One such ailment is bulimia, or "canine appetite." The malady, fortunately extremely rare, is characterized by a compulsion to eat and inability to feel full.

People so afflicted have been known to devour hundreds of pounds of food within a week, pausing only to retch.

Pickwickian syndrome is another rare complication of obesity. In this condition, the patient bears so much weight over his chest cage that he cannot expand his lungs normally for proper breathing. To sleep he must adopt a semireclining position.

One of the characteristics of Pickwickian syndrome is the patient's need to have a helper to maintain obesity.

Dr. Hackett recalled a patient—a one-time beauty queen—who was admitted to the MGH some years ago weighing close to 500 pounds.

"The Fire Department had to be called after she collapsed in her home," he remarked. "A stairway bannister was removed, and four fire fighters carried her from the house. At the

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Crushing the Most Powerful Appetite

(Concluded from Page 7)

hospital, two beds had to be linked and equipped with special supports to hold her."

The woman turned to food after her husband reportedly mistreated her. On reaching the size at which she could no longer go out to buy food, she demanded that her daughters maintain her supply. They obeyed because they feared losing her affection.

The mother benefited from her treatment and was discharged but later wound up in another hospital with the same problems.

Emotion can depress one's appetite just as readily as stimulate it.

Lying at the opposite end of the appetite spectrum from bulimia is a more common condition known as anorexia nervosa, or nervous loss of appetite (*MGH News*, October 1976). It develops primarily in females under 25.

Convinced that thinness reflects beauty, young women suffering from the psychological illness will diet to excess and feel stuffed after consuming only scraps of food. They may literally diet to death.

Some students find it difficult to eat before an examination. People who fear height may shun food on an airplane.

"It doesn't take much to crush the most powerful appetite," said Dr. Hackett. He related how during a visit to France he fasted most of a day in order to better enjoy a sumptuous dinner that night at a highly recommended restaurant.

After ordering the meal, he realized that he had to make a telephone call. To reach the phone in the small, rather informal restaurant, the doctor had to walk through the kitchen.

"The cooks were busily slicing and dicing onions, and there was garlic in the air," he remarked. "It was wonderful. Then, suddenly, I spied a cat.

Without anyone paying the least bit of attention, it walked across the kitchen carrying in its mouth a large, limp rat.

"In a split second, my careful, day-long gastric preparation was lost. My appetite vanished."

Most frequently, absence of appetite can be attributed to depression—a mourning for someone or something that has been lost.

To the grieving patient, the finest food may become tasteless. The individual may not even be able to keep it in his stomach.

Studies conducted at the MGH in the aftermath of Boston's Cocoanut Grove nightclub fire which claimed 491 lives in 1942 (*MGH News*, November 1977) resulted in a tremendous amount of knowledge concerning grief and depression.

As the victims of the blaze were brought to the MGH, the hospital's Social Service Department immediately undertook to assist relatives. But Miss Ida M. Cannon, then head of the de-

partment, quickly recognized the severity of the grieving reactions.

She called for assistance from Dr. Stanley Cobb, then MGH Chief of Psychiatry, and an associate who later become Chief of the service, Dr. Erich Lindemann.

They found that during the first several days after the fire the loss so numbed the bereaved that the mere thought of food disgusted them. The only thing they could tolerate was liquid in very small amounts.

During the first month, it was not unusual for the mourners to lose five or more pounds a week. Then slowly, as they began to pick up the threads of their lives, the appetites of most returned.

In his talk to the MGH dietary interns, Dr. Hackett cautioned that one cannot be made to "snap out" of a depression.

"Let it run its course," he advised. "You need not encourage depressed people to eat. In most instances, allowing them to eat at will until their grief is resolved is the wisest move."





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MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS

April, 1978

A Proper Life-Style Can Prevent Some Cancers

Fighting the Medical Cost Spiral

The woman who stepped from the elevator on the 11th floor of the MGH's Baker Building was in obvious distress.

For several days, Marjorie M. had lived in a state of fear. Ever since she detected a strange growth in her left breast, thoughts of cancer pervaded her mind.

A surgeon who examined the 42-year-old secretary told her that diagnosis of the lump required a biopsy (surgical removal of a snippet of tissue for laboratory study).

He scheduled the procedure for the MGH's Surgical Day Care Unit.

Mrs. M. visited the hospital briefly for necessary blood, urine, chest X-ray, and electrocardiogram (EKG) tests. The next day she kept her appointment for the biopsy.

It was 7 a.m. when the elevator lifted her the 11 stories to the day care unit. The surgical procedure, conducted under a general anesthetic, began at 7:45. The tissue specimen was obtained and taken to a pathology laboratory where an immediate diagnosis was made. The growth turned out to be noncancerous.

The surgeon removed the lump, and by 9 a.m. the patient lay in the recovery room. As soon as the anesthesia wore off, a nurse relayed the news that Mrs. M. had prayed for. By noon, she was en route home. Only five hours had elapsed since her arrival at the MGH.

If no Surgical Day Care Unit existed, Mrs. M. would have faced three days of hospitalization at considerably greater cost.

Of some 30 breast biopsies performed each month in the unit, an average of 26, or 87 percent, culminate in a verdict of "no cancer" and therefore no hospitalization. The reduction in hospital expense that Mrs. M. enjoyed thus is multiplied many times.

Ambulatory surgery at the MGH dates back at least 50 years. The Surgical Day Care Unit on "Baker 11" opened in 1972, but operations were restricted to those which could be performed with a local anesthetic or no anesthesia.

Expansion of the unit in April 1974, with additional staff and equipment
(Continued on Page 5)

Increasingly, scientific evidence tells us that at least some forms of cancer are largely preventable by individuals guarding their own health. In other instances changes in industrial methods can lessen the risk. The following article seeks to inform readers of some steps they and others can take to reduce the hazards. [EDITOR'S NOTE.]

The staff physician in the MGH Ambulatory Screening Clinic examined the young woman with a sore throat and then gave her a prescription for an antibiotic.

"Call me in a couple of days for the results of the throat culture that I took," he instructed. "If you're found to have a strep throat, you can have the prescription filled.

"Meantime, I want you to return to the hospital Friday morning and have somebody in the Pigmented Lesion Clinic look at that spot on your upper back."

While examining the 22-year-old patient for her sore throat, the doctor had spotted elsewhere the early signs of a malignant melanoma, a particularly virulent form of skin cancer.

The patient heeded the doctor's advice to visit the clinic in the Cox Building, the MGH's center for cancer management and research. A surgeon subsequently removed the lesion, effecting a total cure.

"That's the way we want to pick up melanomas," said Dr. Thomas B. Fitzpatrick, Chief of the MGH Dermatology Service. "We don't want patients to wait until the spots develop into ulcers or nodules before they seek professional help. By then it might be too late to produce a cure."

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Although lacking eye appeal, this beachwear of days past lessened the danger of skin cancer from solar rays.



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Martin S. Bander, *Editor*
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EDITORIAL:

Of Sleet and Snow and Appointed Rounds

Thomas Paine once wrote about the times that try men's souls. Such a time was Boston's Blizzard of 1978 which tested the mettle of the MGH's loyal army of employees. Their souls were tried. And they responded. Although the road in front of the hospital remained plowed, elsewhere huge drifts, abandoned cars, and unplowed thoroughfares demanded strong legs and stout hearts.

There was the Dietary Department worker who struggled on foot against drifts and hurricane-force winds. For three hours from 12:30 to 3:30 a.m. on February 7, he trudged, arriving in time to help with patient breakfasts. Later that morning there was the nurse who stopped to help police take sick babies from snowbound houses to a community hospital. Then she fought the icy, blinding snow to walk to the MGH. And there were the seven or more physicians from one community who skied many miles to the hospital.

And so it went. Virtually every unit and area of the hospital had its quiet heroes who defied the elements, who went about their tasks — some caring for patients, others keeping the hospital running. Once here those who had scorned nature to come often ignored fatigue to continue. Shift after shift, day after day, many labored. Buttressed by their own loyal workers, other hospitals too had their stories of dedication.

What is the MGH? Dr. Charles A. Sanders, General Director, said it best: "Rarely is an institution so fortunate to have such loyalty and respect given it by its employees. Should anyone ever question what this hospital stands for and what makes it the great institution it is, let him remember the storm of February 7, 1978."



Sunscreen Formulas Can Reduce Peril Of Skin Cancer

(Continued from Page 1)

Of 300,000 skin cancers reported each year, 95 percent are attributed to overexposure to the sun's ultraviolet rays. Most of the cancers, called basal cell or squamous cell carcinomas, are curable. Untreated, however, they can develop into potentially serious problems, but they are not usually a cause of death.

"The tragedy is that skin cancer is so preventable," said Dr. Fitzpatrick, who is also Wigglesworth Professor of Dermatology at Harvard Medical School.

"Highly effective sunscreen lotions are available to people who cannot tolerate the sun. If they would only use this protection regularly, the incidence of skin cancer would be reduced tremendously."

The American Cancer Society predicts that during 1978 cancer of various forms will kill 117,000 people who might have been saved by early detection and treatment.

The figure represents 30 percent of the overall cancer mortality toll projected for the year by the Society, which annually distributes large grants to medical centers throughout the nation to help them find ways of defeating the disease.

Malignant tumors develop at varying speeds within the body; but, in general, cancers of the skin, breast, uterus, cervix, larynx, bladder, and colon-rectum respond well to treatment if detected early while still localized.

In contrast, lung cancer is much less successfully treated. One form, called "oat cell carcinoma," yields to drug and radiation treatment. But other types, accounting for two-thirds of all lung cancers, require surgery.

More males in the United States die from lung cancer than from any other kind. "I wouldn't be surprised if, in a few years, it challenges breast cancer as the chief cancer killer among women," said Dr. Homayoun Kazemi, Chief of the MGH Pulmonary Unit and Associate Professor of Medicine at Harvard Medical School.

Photographs: Pages 1, 3, 4, courtesy of American Cancer Society; p. 2, Martin Bander; pp. 5, 6, Myron Daniels; pp. 7, 8, MGH Photo Lab.



WHY START A LIFE UNDER A CLOUD?

Smoking is harmful to the health of an unborn child.

And yet lung cancer is frequently preventable. Dr. Kazemi ranked cigarette smoking as the most significant factor in the contracting of lung cancer, and he added that smoking predisposes people to additional respiratory cancers, such as those of the mouth, tongue, lip, and larynx.

Lung cancer may have taken a back seat among cancers in women because of a lag in their use of tobacco.

"Cigarettes became a major preoccupation for men after World War I and for women after World War II," explained Dr. Kazemi. "Now the women appear to be catching up.

"Our advice to everyone is simply to stop smoking. Parents must educate their children about the dangers posed by cigarettes. If a person has not begun to smoke by the time he reaches 25, he probably will not develop the habit."

Cigars and pipe tobacco are less health threatening than cigarettes but still pose a degree of risk.

Also creating serious concern as a potential cause of preventable lung cancer is the release of many industrial chemicals into the environment.

Senator Edward M. Kennedy (D-Mass.), Chairman of the United States Senate Subcommittee on Health and Scientific Research, has reported that six million American workers are exposed each year to chemicals known to have produced cancer in animals. Another one million workers, he said, have been exposed to asbestos.

"Asbestos is a superb material, useful for many things," said Dr. Kazemi, "but it may have to be restricted to very limited uses where no other material can take its place.

"The development of lung cancer among asbestos workers and those exposed to asbestos is very high, and the incidence becomes astronomical when the person so exposed is also a cigarette smoker."

The government's effort to identify and regulate, or ban, cancer-causing substances in industry is a monumental task, one fraught with the danger of either overkill or underkill. Each year factories across the nation introduce hundreds of new chemicals.

Vinyl chloride, a basic ingredient in countless plastic products, is sharply regulated by the Labor Department, but years went by before the health hazards of this chemical became apparent.

The danger of vinyl chloride was spotted only because it caused an exceedingly rare tumor called liver angiosarcoma.

In recent years a number of states have restricted the use of trichloroethylene, a cleaning solvent used principally to degrease metals. The chemical not only has been linked to liver cancer in mice, but since it oxidizes in the lower atmosphere, it is also labeled a contributor to smog.

When Congress passed the Clean Air Act in 1970, it envisioned healthy, breathable air within five years. A

spokesman for the Environmental Protection Agency said recently that America's air is getting cleaner, but "we're still a long way from having healthy air throughout the country. Urban smog levels remain high. And some industries, such as steel, copper, petroleum, and electric utilities, are lagging in pollution control."

Two years ago, the National Cancer Institute published a survey of cancer deaths covering the more than three thousand counties in the United States. The report showed a clear concentration of certain forms of cancer in industrial areas.

Lung, liver, and bladder cancers were found to be numerous in counties, particularly those in the Northeast, where many chemical industries are located.

Along the Gulf Coast from Texas to Louisiana, both lung and liver cancers were high near oil and chemical installations. And in areas of the nation where plants are engaged in smelting and refining copper, lead, and zinc ores, the incidence of lung cancer was significantly higher than normal.

Earlier this year, a Congressional committee was told that some shampoos, lotions, and other cosmetics contain substantial amounts of nitrosamine, a cancer agent also found in crisp bacon and other cured meats.

One particular type of nitrosamine found in cosmetics was 50 to 100 times what the human exposure would be through food.

Diet is also under intensive study to learn what relationship it might have to cancer.

Since saccharin, the artificial sweetener, has been linked with bladder cancer in laboratory test animals, warning labels are now required on all saccharin-containing products shipped in interstate commerce. Previously, another sugar substitute, cyclamates, came under a government ban.

Smoked meats and fish have long been suspected of a connection with cancers of the digestive tract. Many investigators, however, claim that not enough evidence is in to settle the question.

Physicians continually debate the value of proposing new standards of dietary behavior as a safeguard against gastrointestinal (G.I.) malignancies. Roughage (high fiber foods) is one case in point. A recent theory suggests that eating lots of bran cereals and

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Young Mothers Build Greater Resistance To Breast Cancer

(Concluded from Page 3)

other roughage may protect against certain G.I. cancers.

Dr. Kurt J. Isselbacher, Chief of the MGH Gastrointestinal Unit and Malinckrodt Professor of Medicine at Harvard Medical School, believes such recommendations about various dietary changes are premature.

"The issues must be, and are being, explored," he said, "but right now converting people's thinking on smoking would be easier than altering their entire eating style."

Until the cause of gastrointestinal tumors becomes known, detection and treatment of early symptoms must be stressed as vital for total recovery.

During the past quarter century, physicians have managed to reduce the death rate from stomach cancer by two-thirds. Conversely, the outcome for cancer of the pancreas remains almost universally fatal.

"Pancreatic tumors do not present themselves clinically and produce symptoms until after the tumors are well established," Dr. Isselbacher explained.

He and his associates in the G.I. Unit have been working for three years to develop blood tests to pick up early evidence of pancreatic and other cancers. They are very encouraged by their progress to date.

Blood tests already are used to guard against recurrence of cancer of the colon following removal of damaged

Maintaining a Guard Against Cancer

Don't gamble with cancer.

While no one can be protected completely from the disease, certain precautions can minimize the risk of some forms.

Preventive measures:

- Avoid overexposure to strong sunlight unless protected by a sunscreen lotion.
- Stop smoking.
- Since some medications once thought to be safe may have untoward consequences, avoid the casual taking of drugs. Those taken during pregnancy may be especially dangerous to the unborn child and should be ingested only under explicit orders of a physician.

- Help fight air pollution by avoiding unnecessary uses of energy.

- Eat and drink in moderation. While there is no proof that certain diets result in human cancer, over-indulgence is never wise.

For early detection:

- Women should conduct a monthly breast self-examination and undergo an annual Pap test.
- Men and women should have regular health checkups that include examination of the rectum and periodically, the colon. The mouth should also be regularly inspected.
- Be alert to the American Cancer Society's seven warning signs.

portions of that organ.

Although the cause of the leading cancer killer among women, breast cancer, is uncertain, several techniques for early detection are available.

Most commonly practiced is self-examination of the breasts, a monthly, two-minute check for lumps or swellings, or any discharge from the nipples.

Studies have shown that women who become pregnant early in life are much less likely to develop breast cancer than other women.

Dr. Howard Ulfelder, Deputy to the MGH General Director for Cancer Affairs, said immunologists believe that pregnancy stimulates the mother's ability to stave off disease.

"Since the body's immune mechanism appears to become less effective as years go by, the young expectant

mother would naturally enjoy the greatest protection," he said.

Annual Pap tests are recommended for women over 20, and for teen-age girls who are sexually active, to check for possible cancer of the uterus and cervix.

Sometimes medication employed for treatment is ultimately found to be associated with cancer.

Several years ago, Dr. Ulfelder initiated a study which uncovered the danger inherent in diethylstilbestrol (DES), a nonsteroidal, estrogenic hormone which many pregnant women took at the time to avoid miscarriage.

The doctor, who is also Joe V. Meigs Professor of Gynecology at Harvard Medical School, treated several teen-age girls referred from other hospitals for cancer of the vagina. Since physicians rarely encountered the abnormality (a clear cell carcinoma) and almost never in young women, Dr. Ulfelder decided to investigate the cause.

Studying it was an MGH team including Dr. Arthur L. Herbst, now Chairman of the Department of Obstetrics and Gynecology at Chicago Lying-In Hospital; Dr. Ulfelder, and Dr. David C. Poskanzer. They learned that the mothers of most such patients had taken DES while pregnant.

"DES is no longer being prescribed," Dr. Ulfelder said. "In fact, most obstetricians today are reluctant to prescribe any form of medication during pregnancy except whatever is absolutely necessary for the mother's health, such as insulin for diabetes."



Examination of the mouth for possible oral cancer should be a part of every general health checkup.

MGH Stresses Wisest Use of Resources

(Continued from Page 1)

made it possible for patients to undergo a variety of more complicated surgical procedures under general anesthesia and still avoid overnight stays.

By eliminating many round-the-clock nursing and other services that inpatient status demands, savings accrue not only to the person treated but to the hospital – and consequently to other patients – as well.

Such economies are the partial result of an MGH effort to combat the high cost of providing quality medical care.

With nearly 30,000 patients admitted to the MGH each year and many additional thousands treated in the offices of its physicians or in its Ambulatory Care Division, the task of balancing a budget in the face of ever-present, inflationary forces can be mind boggling for hospital administrators.

Unlike most institutions, a hospital never closes its doors. It must be fully staffed around the clock every day of the year. Using highly sophisticated instruments, today's hospital personnel must be both well trained and well paid.

Just how sophisticated does treatment have to be? That very question is presently being explored at the MGH by a Medical Practices Evaluation Unit directed by Dr. George E. Thibault, a staff cardiologist. The unit is financed by a grant from the Milbank Memorial Fund of New York.

"This issue of technology that we are investigating is one of the most critical in modern times," said Dr. Charles A. Sanders, General Director of the MGH.

"We can turn out new devices with remarkable frequency, but what will be their effect on the quality of life? Can the same improvement in care be achieved in some less costly way? These are vital questions."

To make sure that MGH funds were being spent as wisely as possible, Dr. Sanders in early 1975 established a Resource Allocations Board comprised of four administrative personnel and five doctors. The latter represent expertise in surgery, medicine, anesthesiology, and radiology.

Believed to be the first panel of its kind in the country, the board under the chairmanship of MGH Associate General Director Lawrence E. Martin

scrutinizes requests for major new services or equipment.

The committee judges the potential of each request to enhance the quality of patient care at the hospital and recommends assignment of priorities for available funds.

Dollar-saving measures have been instituted in every phase of the hospital's operation, from finding ways of treating patients more efficiently at less cost to snapping off lights left on needlessly.

Energy is a major factor. With some 19 buildings to illuminate and heat, as well as a need to power an immense variety of specialized equipment, the MGH constitutes one of the Boston Edison Company's largest customers.

In fiscal 1977, Boston Edison's bill to the hospital for electricity and steam (essential in heating and cooling systems) came to \$5,553,000. Projected estimates of the cost in fiscal 1978 total \$6,290,000.

Through a wide range of conservation measures, the MGH Engineering and Maintenance Department, directed by William L. Clemons, hopes to reduce by 10 percent the hospital's use of steam and electricity, thus cutting more than \$600,000 from the expense originally projected.

In the area of communications, adoption of a new system of routing outgoing telephone toll calls and of providing information on them has dropped the hospital's annual toll charges by 26 percent, or \$85,000.

Automatic Route Selection, with a

simplified dialing system, dispatches all toll calls in the cheapest way possible.

Previously, to use WATS lines and get the benefit of their discount, the caller had to dial a choice of several access numbers and frequently made a poor choice. But as of last April, with Automatic Route Selection, the equipment sends all calls automatically over the least expensive route.

Another system called Message Detailing also helps to control telephone usage.

"Previously when a call went out on a WATS trunk, we were given no record of it," said Mrs. Evelyn Olschewski, MGH Director of Communications. "Now we receive full details on every toll call: whether or not it went over WATS, the number dialed, where the number is located, when the call was made, how long the conversation lasted, and from what line it was dialed."

"These details are forwarded to the department where the call originated. If the call did not involve legitimate business, the department head can take appropriate action."

A major battle at the MGH to hold the reins on costs is waged by the Materials Management Department which last year processed 50,000 orders worth \$40 million.

"The strongest tools we have to fight rising prices are standardization and consolidation," explained Randall P. McDonnell, MGH Director of Materials Management.

"By encouraging use of a particular product throughout the hospital, instead of several brands of similar

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Patient care data to assess the impact and effectiveness of medical technology is fed into a computer's memory bank by Miss Ellen Sherman, RN, of the MGH Medical Practices Evaluation Unit.



Helping the MGH Blood Transfusion Service, Zachary Minichiello of the hospital's Volunteer Department obtains necessary information from Mrs. Stella P. Craig of Sharon, Mass., prior to her donating blood. MGH volunteers serve the hospital in many capacities.

Volunteers Help to Ease Cost Struggle

(Concluded from Page 5)

items, or by consolidating small orders into a single big package, we can stimulate vendor bidding to produce the lowest possible price . . .

"Unless it improves patient care or proves cost effective, I don't necessarily want the 'best' product on the market. What I want is the product that best meets our requirements."

In the face of another anticipated rise in the national inflation rate, Thomas W. Kelly, MGH Director of Purchasing, said his department is striving for negotiated cost reductions totaling at least \$300,000 during fiscal 1978.

Mr. Kelly reported that during the first three months of the new business year, his office negotiated orders that saved \$60,000 on 46 different items, such as \$6,942 on disposable isolation gowns, \$3,373 on syringes and needles, and \$2,808 on paper towels.

Helping the hospital to generate savings in another way is a large and dedicated force of volunteers. More than 900 men and women last year donated 71,000 hours of their time to MGH service. Their duties fell into 48 classifications, ranging from clerical work to patient support services.

As a typical example, 21 volunteers last summer devoted 88 hours to preparing the hospital's annual report for distribution.

Mrs. Maeve Blackman, Director of the Volunteer Department, said volunteers also gather reports from parents

on the home care of children considered at risk for Sudden Infant Death Syndrome.

High school seniors, she said, work in the hospital's hematology laboratory during their senior project period. While learning to perform basic tests, they simultaneously render a valuable service.

Volunteers give many hours toward operation of WMGH, the hospital's closed-circuit television channel. Some of them are students majoring in communications at Greater Boston colleges.

The cost-saving measures mentioned thus far represent only a fraction of the overall MGH economy effort.



Reminders like these turn on MGH personnel to the importance of energy conservation.

In brief, some of the other programs include:

Operation by the MGH and other Harvard-affiliated hospitals of their own insurance company to provide malpractice and general liability coverage.

On the basis of premiums assessed by outside insurance interests in 1976, when the private venture began, the MGH saved \$1.6 million in the last fiscal year. That saving fails to take into account the fact that under outside insurance the MGH had no coverage for the first \$1 million liability whereas the new arrangement covers even the first \$1 of liability.

Self-insurance for Workmen's Compensation. This saved the MGH \$1,277,000 over a recent five-year period.

Utilization Review, the constant monitoring of a patient's hospitalization to make certain the stay is not prolonged unnecessarily.

The Transfer Office, which helps to locate nursing home beds for MGH patients due for discharge but who still require close professional care.

Planning for an Ambulatory Care Center to assure more effective, non-hospitalized patient treatment.

Use of the computed tomography (CT) scanner, permitting certain diagnostic procedures on an outpatient basis.

Use of a cyclotron at Harvard University by an MGH neurosurgeon to treat unusual brain tumors, thereby considerably shortening the hospitalization that traditional surgery would otherwise have required.

Reminders to physicians of the costliness of tests they are about to prescribe.

Avoidance of a duplication of medical services provided by the neighboring Massachusetts Eye and Ear Infirmary.

Operation of the MGH Blood Transfusion Service that additionally meets the blood needs of the M.E.E.I. and the MGH-affiliated Shriners Burns Institute.

The hospital also benefits immeasurably from its unpaid Trustees who devote thousands of hours each year to considering ways that the MGH can operate more economically.

While some of the programs described were pioneered by the MGH, many others originated elsewhere, and a number of them are being used in one form or other by hundreds of American hospitals struggling against inflation.

Photography Plays Important Role in Medical Training

"It is uncommon in this day and age for a medical lecturer to prepare a complete manuscript. He has an idea of what he wants to say, and he counts on visual aids not only to convey the message vividly but also to shape and orient the presentation."

The comment of Dr. William H. Harris, Chief of the Hip and Implant Surgery Unit of the MGH Orthopaedic Service, underscores a close alliance that exists between the medical fraternity of this teaching hospital and the institution's Photography Department.

The medical photographer possesses special skills to help the physician or surgeon transmit technical aspects of his work.

During each of the past seven years, for example, the MGH photo laboratory has produced a motion picture of new techniques by Dr. Harris and his colleagues in total hip replacement surgery.

Dr. Harris has exhibited each color film, 20 to 30 minutes long, at the annual meeting of the American Academy of Orthopaedic Surgeons. Then 40 to 50 copies have been made for worldwide distribution in the orthopedic field.

"The films have played an important role in attracting surgeons from many countries to the MGH to learn the new techniques firsthand," said Dr. Harris, who is Clinical Professor of Orthopaedic Surgery at Harvard Medical School.



Dr. Richard J. Smith, Chief of Hand Surgery in the MGH Orthopaedic Service, outlines his photographic needs to Miss Kathleen Grady, Administrative Aide in the MGH Photo Lab.

"By alerting specialists to these surgical methods, the movies also have made it possible for patients to be referred to the MGH to benefit from these new procedures."

Motion pictures represent only one phase of the laboratory's expertise. Currently the staff, under the direction of Stanley Bennett, is completing a role in orthopedic basic research, trying to determine what happens on the cellular level to transplanted bones and joints in animals.

The project, which has possible application in man, required dozens of still photographs, many of them made through the microscope.

With the camera work performed by

the MGH photo lab and the layout designed by the hospital's Medical Art Department (*MGH News*, December 1976-January 1977), the project's report will be presented in technical journals and used in educational lectures.

The pictorial needs of medical investigators cannot be relegated easily to an independent commercial studio.

"Researchers must ally themselves closely with people who understand the complexity of the studies and can also deliver the services needed with speed and absolute accuracy," explained Mr. Bennett, who has directed the MGH Photography Department for 17 years.

Aided by a staff consisting of Robert Crivello, Joel Salhanick, Marlene Fuchs and Kathleen Grady, Mr. Bennett's laboratory over the past year has processed a record 11,500 orders from more than 300 MGH staff personnel.

Most of the lab time is taken up by copy work: duplicating pictures, X rays, charts, graphs, pages of type, etc. for teaching purposes or publication.

"Our dollar volume has more than tripled since 1961," Mr. Bennett said. "This can be attributed to new techniques and new films which have allowed us to consistently turn out products faster and better than before."

"We raised prices only once, in 1968. The increase in our volume alone has kept us abreast of inflation. In fact, we recently reduced the price of two much sought items."

Many doctors regard photography as
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Using a special camera capable of handling film as large as 14" x 17", Photographer Robert Crivello prepares to reproduce an X ray to fill an order for prints and slides of the picture.

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Photography Often Assists in Patient Care

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an integral part of the patient care process. By comparing a picture of a congenital deformity, for example, with another photo taken after reconstructive surgery, one can frequently obtain more information about the patient's progress than from any oral or written description.

Photography also helps the doctor to describe a planned operation to a patient. Viewing the results of similar surgery performed upon others can calm the worst fears. The surgeon must exercise extreme care, however, to avoid the implication that the same results are assured. Few problems are exactly alike.

Medicine and photography joined hands at the MGH more than 125 years ago. Pictures then were known

as daguerreotypes. They were light-sensitive, silver-coated metallic plates which picked up images and were developed in mercury vapor.

Dr. Henry J. Bigelow, an internationally acclaimed MGH surgeon, had daguerreotypes made of patients as early as 1851. He later donated the pictures to Harvard Medical School where he served as Professor of Surgery.

The popularity of daguerreotypes declined with the introduction of a method of imprinting pictures on glass plates coated with a wet collodion emulsion.

Dr. Oliver Wendell Holmes, an MGH physician and Professor of Anatomy and Physiology at Harvard Medical School, liked to refer to the sensitized plates as "mirrors with a memory."

Dr. Holmes, father of the United States Supreme Court Justice, wrote

articles on photography for the *Atlantic Monthly*.

Photography began to assume the status of an institutional function at the MGH in 1887 with receipt of a nominal donation to buy photographic apparatus. Picture-taking became the added duty of the hospital pharmacist and his assistant.

In 1895, when Walter J. Dodd was named Chief Pharmacist, reports reached America that German physicist Wilhelm Roentgen had discovered a way to photograph bones of the body.

With his assistant, Joseph Godsoe, Dodd pursued an intensive study of the new science of X rays.

Dodd later obtained a medical degree (1908), turned over his Chief Pharmacist post to Mr. Godsoe, and became head of what is now the MGH Department of Radiology. In those days, the precautions required in handling X rays were unknown. Like many other pioneers in this field, Dr. Dodd suffered severe burns from his work. In advancing radiology, he lost both arms and in 1916, at age 47, his life.

Photography developed at a steady pace at the MGH under Mr. Godsoe's direction, but it was not until a little more than 50 years ago, in 1927, that the MGH trustees voted to establish a photography laboratory at the hospital.

Another three years passed before the first full-time staff photographer was hired. He was Wilbour C. Lown.

Accommodating 300 staff personnel, many of whom require highly specialized services, can become an overwhelming task for today's photography crew, but increasingly doctors, especially surgeons, are taking their own pictures of patients.

"We don't feel threatened by this at all," said Mr. Bennett. "In fact we encourage the practice since we are then able to devote more time and effort to assignments that the doctors can't handle themselves."



An interesting silhouette of Photographers Joel Salhanick and Marlene Fuchs as they work with a 35 mm. copying camera in the MGH Photo Lab.



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Shedding Light on a Common Affliction of Man

Special Clinic Treats Problems of Runners

A few years ago running was regarded solely as a means of getting from one place to another in a hurry.

Then somebody asked, "Why the rush?"

By eliminating the elements of speed and competition, it was postulated, people of all ages could benefit physically from running.

A new leisure-time activity was created and christened jogging. Today, jogging is a national pastime.

As the sport drew literally millions of enthusiasts, however, one thing was overlooked: the danger of doing too much too soon.

Even in organized track, whose popularity rose with that of the jogging craze, participants often tend to push themselves beyond the body's endurance.

To meet a deep concern for the well-being of both the runner in organized sports and the nine-to-five worker who jogs at sporadic intervals when his schedule permits, the MGH has just launched a Runners Clinic.

The facility, administered by the MGH Orthopaedic Service, is an extension of the hospital's Sports Medicine Clinic (MGH News, October 1976) which was established with the initial emphasis on evaluating and treating musculoskeletal injuries among athletes.

"Runners comprise a distinct group who tend to have their own set of problems," said Dr. Steven R. Levisohn, an MGH internist and member of a multispecialty team which operates the Runners Clinic.

"There has been a real explosion in the number of runners in this country in the last three or four years. Most of them not only engage in intensive workouts but run year-round in all kinds of weather."

A conditioning and rehabilitative endeavor as well as a sport, running is attracting participants faster than gaps in medical literature on the subject can be filled.

Only in a multidisciplinary medical setting can the many problems sometimes caused by running be sorted

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Running for fitness and fun

Have you ever peered at an elderly relative or friend and suddenly gotten the feeling that the person had become shorter? You could be right.

From time to time one also hears of someone suffering a seemingly minor fall only to spend weeks in bed recovering from a hip fracture.

In each instance, an accusing finger may be leveled at a disease called osteoporosis. One of the most common bone disorders affecting men and women in their middle and later years, osteoporosis precipitates a breakdown in the structure of bone, making it thin, porous, and brittle.

The degeneration can lead to a settling of vertebrae in the spine, eventually causing some people to shrink and hunch over. Fractures of the hip and wrist are typical consequences of the condition which besets millions of Americans. Women past the menopause are particularly prone to the ailment.

Physicians claim that elimination of osteoporosis could prevent 350,000 fractures in the United States each year.

The disease probably has multiple causes, but an inability to absorb dietary calcium from the intestines is one important factor in causing osteoporosis. For example, recent studies show that the disease often can be arrested by large supplements of calcium in the diet, thus compensating for the poor intestinal absorption.

The cause of the poor calcium absorption is unclear, but MGH investigations have indicated that natural and artificial lighting help to make dietary calcium more available to the body.

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EDITORIAL:

In the Matter of Chad Green

A lot has been written about Chad Green, a 2-year-old child with leukemia. The subject is complicated, and many news media accounts have been confusing. Part of the misinformation results from failure to understand that childhood leukemia differs from adult leukemia and other cancers. Indeed many people are unaware of the tremendous strides made in treating childhood leukemia in the last decade.

Medicine is not an exact science. Doctors do not have all the answers. Yet sometimes, as the Judge ruled in Superior Court, the evidence is overwhelming:

Chad has the most common form of childhood leukemia. It is also the most successfully treated form. His chance for cure last November when he was on chemotherapy (drug treatment) and symptom-free was at least 50 percent. That means that he had at least one chance in two that he would be alive, free of leukemia, and off chemotherapy five years from now. However, in November his parents stopped giving him his pills without informing the doctors and placed him on a "nutritional diet." By February, despite the nutritional diet, his leukemia had fully returned.

Since his drug treatment had stopped for so long, no one can say what his chance for cure is today — except that the opportunity is still substantial, if he remains on chemotherapy. There is overwhelming statistical evidence that without drugs his chance appears to be zero.

Under state law the MGH had to bring the parents to court when they refused to continue treatment. Do not parents have the right to choose the form of therapy their children receive? Courts have consistently ruled that conventional medical treatment when potentially lifesaving must be given to minors. For Chad's illness there is no known successful alternative treatment. Under the law a parent has a right to refuse lifesaving care for himself but not for his child. The law even denies parents the right to keep their child out of school.

Some strange aspects to the Chad Green matter: *Chad's side effects from chemotherapy — despite implications to the contrary — have been minimal.* So minimal that the main complaint is about the needles. Needles do hurt for the brief time they are inserted whether for polio shots or leukemia drugs. But in Chad's case the most needle-intensive part of his care had ended in November. He was on a once-a-month hospital maintenance injection schedule when his parents stopped administering the chemotherapy pills at home. *It is precisely because they discontinued the medication that more intensive treatment had to be resumed for two months.*

Another fact: the MGH has at no point wanted to separate Chad from his parents. Indeed the hospital has consistently urged the courts to let the child remain with them. At one juncture when Chad required a temporary admission, the MGH encouraged his mother to

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Soldiers' Home Test Demonstrates Value Of Special Lighting

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The element is a basic component of bone, and vital in the blood for proper function of nerves and muscles.

To be obtained normally from the intestines, calcium requires the help of vitamin D which is actually a natural hormone manufactured in the skin under the influence of the sun's rays. A deficiency of vitamin D lowers calcium absorption.

The bodies of young people regulate their intestinal calcium absorption to compensate for fluctuations in the diet. Older people are unable to make this adjustment. To meet their needs, their bodies draw upon calcium already in the bone.

"This is like robbing Peter to pay Paul," said Dr. Robert M. Neer, MGH endocrinologist and Director of the hospital's Ward 4 General Clinical Research Center. "By taking the calcium from the skeleton, the skeleton becomes thinner, weaker, and more brittle."

In the United States and a number of other countries, processors add vitamin D to certain foods, particularly dairy products.

Excessively increasing the vitamin in the diet, however, in an effort to enhance calcium absorption can be harmful.

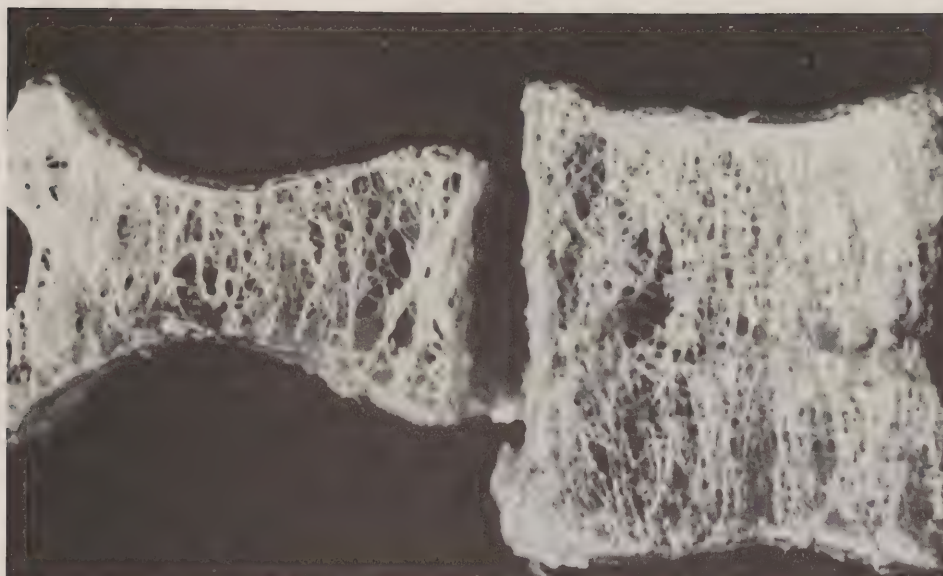
"The way nature intended you to get vitamin D is not by mouth anyway," said Dr. Neer, "but by making it yourself through your skin with the help of sunlight."

One must, nevertheless, always be on the alert against overexposure to direct rays of the sun because of the danger of skin cancer.

Dr. Neer, an Associate Professor of Medicine at Harvard Medical School, set out a few winters ago to learn what influence light has on the human body's ability to absorb calcium.

Fluorescent bulbs designed to mimic sunlight were installed in a room at the Chelsea, Mass., Soldiers' Home. Providing ultraviolet rays, the lamps had the intensity of 500 footcandles,

Photographs: Pages 1, 4, 5, 6 (upper), 7, Myron Daniels; p. 3, courtesy of Dr. Robert M. Neer; p. 6 (lower), courtesy of Dr. Bertram Zarins.



Damage from osteoporosis can be viewed in this photo of two spinal bones (vertebrae). Bone at right is normal while the one at left is compressed by the disease. Such compressions can affect stature.

or 10 times the brightness of the average fluorescent light used in an office.

The brilliance of the special light equaled that which one would experience on a sunny summer day while sitting under a tree at lunchtime.

Volunteers ranging in age from 57 to 80 spent eight hours a day for a month in the special room. Tests later showed that their absorption of calcium, apparently triggered by the body's manufacture (synthesis) of vitamin D in the skin, increased by nine percent.

This compared with a decrease of about eight percent among members of a second (control) group at the Home who were exposed only to conventional fluorescent or incandescent lights not delivering any ultraviolet radiation.

To verify the test results, the experiment was repeated a year later at the Home. More than a third of the men in the second test were new to the project. The second findings substantiated the first results.

Dr. Neer and his associates decided next to study differences in the vitamin D blood levels of the average healthy population in this country.

Supported by grants from the National Institutes of Health and the National Dairy Council, the investigators studied telephone company employees in Boston, Detroit, Seattle, Denver, Des Moines, Ia.; and Palm Beach, Fla.

"We wanted to test vitamin D blood levels of people who worked at various latitudes and were exposed to different amounts of sunlight," Dr. Neer said. "We also wanted to determine

any seasonal changes in the quantity of the vitamin."

The team found that people had higher blood levels of a vitamin D derivative (25-hydroxy vitamin D) in the summer than the winter, reinforcing the belief that sunlight exerted a major influence.

The levels, on average, also were higher among people in Palm Beach than in the northern part of the United States. And although Denver and Boston are situated at virtually the same latitude, the levels in Denver proved to be much higher than in Boston.

Dr. Neer explained that the ultraviolet radiation in Denver is stronger because of the city's mile-high altitude.

"As a result of the work we had done in Chelsea," he said, "we also thought it would be interesting to compare the vitamin D levels of the telephone company employees who worked outdoors in the six cities with those of phone personnel in the same communities who had inside jobs. In every season, those outdoors had greater amounts of the vitamin."

While impressive, Dr. Neer's work on vitamin D synthesis and calcium absorption is incomplete. Many questions remain unanswered.

What effect, for example, does light have on activating vitamin D? To regulate calcium absorption from the intestines, the vitamin must first be activated by chemical changes to it that take place in the liver and then the kidney. Only in recent years has research produced methods of measuring the activated vitamin.

Also, how much of the vitamin

comes from the diet and how much is made in the skin after exposure to sunlight? The type added to food is usually a form called D2. The skin produces a kind referred to as D3.

Biologically, D2 is the equivalent of D3, but a chemical difference can be detected in a laboratory.

"We're now gearing up for a study in which we'll ask people to wear badges every day for a month," Dr. Neer reported. "The badges would measure how much ultraviolet the people were exposed to."

"We will then take blood samples and fractionate the blood to determine how much D2 and D3 each person got."

Among a group of volunteers studied by other investigators in Montreal, half of the vitamin D levels in each test participant came from the diet and half from the skin.

In many areas of the world, food is not fortified with vitamin D. In Britain, it is added only to butter. The rate of vitamin D deficiency in that country is high.

If a pregnant woman becomes deficient in the vitamin, her child likely will suffer from the problem as well.

In India, children born to Mohammedan women were discovered to have a greater shortage of vitamin D than the offspring of Hindu women.

The probable reason was that when pregnant Mohammedan women went outdoors they wore traditional clothing that covered almost their entire bodies, including their faces. The Hindu women had much more exposure to the sun.

Among children, bone disease caused by insufficient vitamin D is labeled rickets. Always uncommon in the tropics, rickets at one time was very prevalent in northern latitudes. Then researchers discovered that the disease could be treated effectively with ultraviolet light.

The disorder has not been a problem in the United States since the 1930s when vitamin D was first added to milk.

Rickets, however, continues to create concern in some other parts of the world such as in Scotland. Not only is the vitamin left out of food there but also air pollution restricts the amount of sunlight that can reach the ground.

Conditions such as these are spurring studies to determine the value of fluorescent lamps that can artificially duplicate sun and sky radiation.



Man who collapsed at work is wheeled into Emergency Ward after arrival at the MGH in a police ambulance.

A Front Line of Medical Care

Officer Bill Donnelly dashed into the street in front of the MGH's White Building as he heard the distant wail of an ambulance siren.

By the time the ambulance, with its red lights flashing, came into view, the hospital security officer had waved traffic to one side, clearing the way for the ambulance to pull up to the entrance of the Emergency Ward (EW).

The driver hopped out, swung open the rear doors of his vehicle, and helped an attendant remove a stretcher. A blanket covered all but the face of a man who had been seriously hurt in an automobile accident only minutes earlier.

Alerted by radio of the approaching ambulance, the EW was ready. On the patient's arrival, Mrs. Joan Nolan, RN, the triage (screening) nurse on duty, quickly verified that he required immediate care. She instructed the ambulance crew to wheel him directly to a trauma room, bypassing the EW's booking desk.

A surgical resident began to determine the full extent of the patient's injuries. His condition was stabilized, and then he was admitted to the hospital for definitive treatment.

Literally a hospital within a hospital, the Emergency Ward at the MGH handles a full range of patient needs.

Open around the clock seven days a week, the ward is staffed at all times by as many as three surgical residents, six medical residents, and six nurses.

In addition, specialists representing every medical and surgical field are on call.

On an average day, 210 patients will pass through the ward's swinging doors. Only a fraction, however, arrive by stretcher or wheelchair.

Despite the implication of its name, the EW does not restrict its services to individuals in dire need of *instant* medical attention.

"Eighty percent of those who visit the ward could be treated equally as well at a clinic," said Dr. Earle W.



At entrance to EW, patient stops to answer a few questions from Miss Klara Sztucinski, Admitting Assistant.

Wilkins, Jr., Chief of Emergency Services at the MGH.

"Another 15 percent require treatment but not necessarily at the moment. A wait of a half hour or more would do no harm.

"The remaining five percent are the real emergencies. They may be patients suffering from such conditions as a heart attack, cardiac arrest, respiratory failure, shock, a hemorrhage, or a compound fracture.

"In general, a person with abdominal pain is examined immediately because the pain could result from a burst appendix, ruptured aneurysm [swelling of the wall of a blood vessel], a perforated ulcer, or an inflamed gall bladder."

Recognizing that each visitor attaches a special significance to his or her own set of circumstances, the EW accepts the patient's definition of an emergency. No one is turned away.

"We will treat the patient in the EW unless we feel there is a better way or place to care for that person," said Dr. Wilkins, who is also Associate Professor of Surgery at Harvard Medical School.

Patients with dermatologic and gynecologic problems, for example, are directed during regular hours to MGH clinics having special expertise in those fields.

Many patients with less than acute needs are referred to the MGH's Ambulatory Screening Clinic, located just a few steps from the EW.

A special unit within the Emergency Ward treats pediatric problems, emergency or otherwise.

The value of that unit was underscored nearly four years ago when a carnival ride accident in Boston's Charlestown district injured 20 young people, one fatally. All were brought to the EW at the MGH.

Guided by the pediatric staff, residents on the adult services joined in ministering to the casualties. "For some of the residents, treating children was a new experience," Dr. Wilkins remarked, "but everyone did an extremely fine job in that emergency."

The EW staff has been tested by numerous other emergencies, such as in December of 1973 when an airliner from Madrid with 168 persons aboard crashed and burned during a landing at Boston's Logan Airport. All 16 persons needing attention were treated at the MGH.

In April of 1976, the EW staff

treated nearly a score of casualties from a bombing which shattered a probation office at the Suffolk County Courthouse, situated near the hospital.

"We were able to provide good care without doing anything beyond what we would do routinely," said Dr. Peter L. Gross, Assistant Chief of Emergency Services.

An emergency that led to a special call for additional doctors and nurses occurred in August of 1975 when three subway trains collided near the MGH at the height of the afternoon commuter rush.

Of 126 persons injured, 107 were taken to the MGH for treatment of fractures, cuts, or concussions.

Despite the large numbers involved in some accidents, the EW can be more pressed in treating a handful of severely burned patients than 100 persons with minor injuries.

Generally, of the patients treated in the EW on a given day, between 30 and 50 will require admission to the hospital. Frequently, the determination follows a period of observation in the 18-bed Overnight Ward, an adjunct to the Emergency Ward.

"The evaluation of a patient could keep him in the Overnight Ward for two or three days," said Dr. Gross. "The surgical service might decide to use that area for emergency X-ray studies prior to possible surgery. A neurosurgeon treating a patient for a concussion might want him observed at least 24 hours to check on his response."

Of all the patients admitted to the



Patrick Baillie, EW Admitting Assistant, receives requests from, left to right, Drs. Edwin L. Zalneraitis, Howard S. Kirshner, and Phyllis I. Gardner for the medical records of patients treated a short time earlier.

MGH, approximately 43 percent enter through the EW and receive their initial examination or treatment there.

Because the condition of some patients entering the EW demands immediate care and that of others does not, a "triage" system establishes priority for treatment.

Upon the arrival of each patient, a triage nurse makes a rapid assessment of that person's ailment or injury. If the need for EW care is evident, the patient is assigned to a minor or major medical or surgical area.

Dr. Gross said many of the triage nurses have previously served in one or more of the hospital's intensive

care units while others trained specifically for duty in the EW.

Even after a staff nurse is assigned to the EW, however, she does not engage in triage duty until after an appropriate period of observing the work of an experienced triage nurse.

"Triage duty is an extremely demanding assignment," said Dr. Gross, who is also an Instructor in Medicine at Harvard Medical School. "During busy periods, two nurses might have to share the responsibility."

Similarly, times arise when residents team up to treat a single patient. The task of reviving a person suffering from cardiac arrest, for example, falls upon three physicians.

One doctor keeps the patient's airway unobstructed while another concentrates on compressing the chest. The third resident stands ready to inject any necessary medication.

Other key personnel, including nurses, stand alongside to monitor essential medical instruments.

Improvement in the training of municipal and private ambulance company drivers is resulting in better first aid at accident scenes, but the effect on patient survival is yet to be determined.

Much of the credit for the advanced training belongs to an Emergency Medical System developed in Boston by the city's Department of Health and Hospitals, the state Department of Public Health, and the Conference of Boston Teaching Hospitals. Under the chair-

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Miss Peggy Dooling, RN, right, of the MGH's Medical "A" Clinic, consults with two EW triage nurses on specialized treatment needed by a clinic patient. From left are Miss Jacqueline Lee, RN, and Mrs. Joan Nolan, RN.

Doctors Can Expand Their Medical Skills In Emergency Ward

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manship of Dr. Wilkins, the group has set a goal of improving emergency medical care in the Boston area.

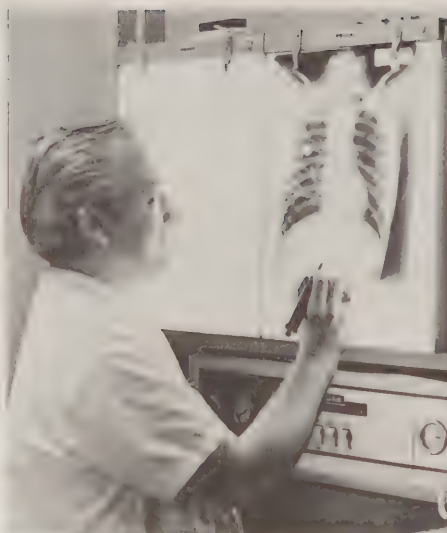
On the surgical side, the patient with multiple injuries resulting from a severe accident such as an automobile collision or a fall likely will require the services of more than one surgical resident.

While treating minor medical complaints, one resident can often care for more than one patient simultaneously. The physician might order tests on one individual and, while waiting for the results, begin examining a second EW visitor.

During fiscal 1976-77, the Emergency Ward accommodated 77,699 patients. Except for the previous year when the total reached 80,517, patient visits have hovered in the mid-70 range since 1973. Prior to then, since 1950 a steady seven percent annual climb had taken place.

The public's growing use of the EW to replace the general practitioner who made house calls contributed to this trend, a national phenomenon.

The leveling off at the MGH is attributed, at least in part, to the availability of treatment in the Ambulatory Screening Clinic.



Bedside X ray of teenager brought into the Emergency Ward with a chest problem is checked by Delphis Kaczowski, X-ray Technician. Tubing and monitor lines are visible in the film.

Dr. Wilkins had the highest praise for the EW nursing staff and administrative personnel. "The nurses comprise the principal unifying force there," he said. "The residents come and go on a rotation schedule, but the nurses are assigned on a regular basis. Without them, we couldn't run the EW. The administrative side keeps the entire operation functioning smoothly."

Residents know that working in the Emergency Ward is difficult and physically taxing. However, not one physician or surgeon regrets the assignment.

"From the point of view of educa-

tion, a tour of duty in the EW is one of the most profitable rotations at the MGH," Dr. Wilkins said.

"Nowhere else in the hospital do residents have an opportunity to treat the 'pure' patient. The first doctor he consults is the resident in the EW.

"Not having told his story to any other physician, the patient is not prejudiced in his response to questions by the resident. This initial patient-doctor confrontation is an extremely valuable experience for the young MD. At the same time, the residents are so superbly trained from face-to-face emergencies that they often provide better care than more senior physicians in the communities who encounter such problems less frequently."

The scope of the EW's activity knows no bounds.

In March, a second-year resident, Dr. John S. Wolfson, received an unusual request to help provide follow-up treatment to a patient who was revived after a cardiac arrest.

After being informed that the patient had a very irregular heartbeat as well as other complications, Dr. Wolfson advised the appropriate treatment and medication.

The MGH resident spoke by phone to a Sudbury, Mass., dentist, Dr. Donald Sherman, who is also a ham radio operator. Dr. Sherman relayed the instructions by radio to the person who requested the assistance, a doctor in Guyana, formerly British Guiana, 2,500 miles from Boston.

Multidisciplined Staff Mans Runners Clinic

(Continued from Page 1)

out, evaluated, and treated in a way that will establish treatment guidelines for the future.

"Basically, we examine two groups

of people," Dr. Levisohn said. "First, and primarily, runners who are encountering difficulties and then individuals who would like to take up the sport but need guidelines.



Women runners vie for laurels in a road race.

"The latter may be concerned that they have never before engaged in any strenuous exercise. Or they may be taking medication for some ailment, such as high blood pressure.

"The clinic, however, does not undertake the rehabilitation of cardiac or postcoronary patients. An exercise program for such persons should be conducted under the close, direct, and ongoing supervision of private medical personnel."

In addition to Dr. Levisohn, the clinic is staffed by two orthopedic surgeons, Drs. Bertram Zarins and Dinesh Patel; a general surgeon, Dr. Stephen E. Hedberg; a podiatrist, Richard Di-Mario, D.P.M.; and a certified athletic trainer, Robert Sevene.

Drs. Levisohn and Hedberg are veteran joggers who also have competed in distance races, including the famous Boston Athletic Association

A Bulfinch Milestone Recalls an Odd Loss

To those for whom the MGH has special meaning, this July 4th will commemorate more than the birthday of America's independence.

The day will also mark the 160th anniversary of the laying of the cornerstone for the hospital's original structure — the Bulfinch Building.

And therein lies a mystery which has

baffled members of the MGH family for generations. The cornerstone, a large chunk of Chelmsford granite, is missing.

No one suspects skullduggery. It's just that the hospital's original records failed to note where the cornerstone was placed. Over the years, the Bulfinch Building has expanded on every

side except the front (south). Even there grading of the land has risen to a level which could hide the stone.

The ceremony which took place on July 4, 1818 was an historic one because it set in motion the construction of the first voluntary, nonprofit, general hospital in New England and only the third such institution in the United States.

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Marathon.

A seven-time All-American track star and member of the world's record two-mile relay team in 1967, Mr. Sevene coaches members of the Greater Boston Track Club and is personal mentor to the world's top-ranked marathon runner, Bill Rodgers.

An important feature of the Runners Clinic is the backup care available at the MGH. If a clinic patient appears to require the attention of such specialists as a cardiologist because of chest pain, a gastroenterologist to treat a stomach or intestinal problem, a pulmonary expert due to respiratory difficulties, or a nutritionist to prescribe a special diet, the appropriate professional is just steps away.

The need for supervision of both organized and leisure running was emphasized by the clinic's trainer.

"In the early 1960s," Mr. Sevene said, "runners preparing for competition ran 30 or 40 miles a week. Now our boys at the Greater Boston Track Club are doing up to 150 miles a week. It's debatable how long the body can take it.

"Runners used to retire at age 23 when they graduated from college. Bill Rodgers is 30 years old, and he's talking about the Olympics in 1980."

Mr. Sevene, who ran competitively until the age of 32, said the greatest concern today is for people 30 to 40 years old, and older, who never engaged in organized sports in school or college but suddenly become enamored of an athletic life-style.

In general the human body will prevent a person from extending himself to the danger point, but injuries do occur in running. The way people run and the surfaces they exercise on are part of the problem.

"Preconditioning exercises are vital to every running program," said Drs. Patel and Zarins, who are Clinical Instructors in Orthopedic Surgery at Harvard Medical School.

"Overuse and underuse of muscles, tendons, ligaments, and bone can create special problems in runners. This could be minimized by prerunning evaluation, conditioning, and stretching."

The most careful preparations help little, however, if the runner then elects to traverse a course replete with potholes, stones, loose gravel, or the like which would subject the legs to a merciless pounding.

To deal with such complications, the Runners Clinic works closely with the MGH Prosthetics and Orthotics Laboratory which can quickly fit a patient with any necessary supports.

"In addition to arch supports we can provide runners with foam pads of various densities that are not normally installed in running shoes," said John Snowden, who codirects the laboratory with Ronald Altman.

"We bond two densities of foam together with heat, and while the foam is still warm, the patient stands on it,

allowing us to mold it around his feet. We then simply trim the foam to fit inside his shoes.

"We can also make special provisions to relieve pressure on bunions and other painful swellings on the feet."

Altman said his lab can often accommodate a patient the day after he is examined in the Runners Clinic. "And we can often have his supports ready for him only 30 minutes after he drops by," he added.

Patients are seen in the Runners Clinic on Thursdays between 3 and 5 p.m. The hours may be extended if the need warrants.

"Up to now, most of the medical data on running has been gathered in a very informal way," Dr. Levisohn said. "We're hoping that by means of a multidisciplinary approach we'll amass the experience needed to define syndromes [groups of symptoms] in a way that will assure the best treatment and outlook."



High-stepping along a bank of the Charles River in Cambridge, Mass.

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Searches Fail to Yield Clues to Cornerstone

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Conducted by the Grand Lodge of Free Masons of Massachusetts, the ritual was also attended by a state delegation led by Governor John Brooks and Lieutenant Governor William Phillips, as well as selectmen and health officials of the Town of Boston, representatives of many charitable societies, members of the hospital corporation, and a large gathering of other citizens.

(The hospital's private pavilion, the Phillips House, dating to 1917, was named in honor of Lieutenant Governor Phillips, who served as President of the hospital corporation, and his father. Both donated money to the hospital.)

The Bulfinch cornerstone was placed atop a number of coins and a commemorative silver plate. The Masonic Grand Master, Francis J. Oliver, later poured corn, wine, and oil upon the stone.

He called upon God "to bless the inhabitants of the metropolis, to aid in the erection and completion of the building, to guard the workmen from every accident, and to grant to all the corn of nourishment, the wine of refreshment, and the oil of joy."

He completed the ceremony by formally giving charge of the work to the Master Builder, telling him:

"... This building is not to be a temporary pavilion for the display of opulence, splendor, and pride, but a temple dedicated to humanity, a lazaretto built by enlightened compassion, where charity and philosophy are to walk a perpetual round to alleviate misery, and to combat with and destroy disease and pain."

A search for the Bulfinch cornerstone apparently was touched off in 1920 by the approach of the centennial of the hospital's 1821 opening. But no clues could be found.

The mystery of the cornerstone was the subject of an article in the first issue of the *MGH News* in May 1928. Mrs. Grace Whiting Myers, who had been the hospital's librarian, wrote:

"Sad to relate, at the present time it is impossible to locate this cornerstone. During the many changes which have been made in the building in the one hundred and ten years since the stone was laid, it has either been covered over, or built around, until its position is lost."

During the early 1950s, a search was launched by Carleton N. Goff, then a member of the MGH Maintenance Department and now the hospital's resident architect.

"I went to the northeast corner of what was the original part of the building," he said, "because this was the corner where Masonic custom dictated that the stone should be placed."

Cutting away large sections of plas-

ter both at the basement and first-floor levels, Mr. Goff exposed the original granite (which had been fashioned by convicts at the since-raided Charlestown State Prison), but he found nothing that even resembled a cornerstone.

In 1964 and 1965, Mr. Goff was presented with a great opportunity to look again, this time at the entire back side of the building. A contractor tore down structures abutting it to make way for what is now known as the Gray-Bigelow-Jackson complex.

"The Bulfinch building was exposed clear down to its footings along that north side," said Mr. Goff. "I went out with a ladder and closely inspected the entire building. I couldn't find any cornerstone or any space where there might have been such a stone."

So the cornerstone is missing, but apparently not all is lost. The mystery over its disappearance will not let people forget the stone and what it commemorated. Wasn't that what the stone was intended to do anyway?

EDITORIAL: CHAD GREEN

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sleep over. *The hospital has also from the start offered to let the parents use "nutritional treatment" (which ultimately failed Chad) so long as they continued chemotherapy. If Chad clearly relapses while under chemotherapy, the doctors would advise its discontinuance. They have no desire to continue a treatment that has failed.*

Ironically, the unit in which Chad is cared for as an outpatient was established several years ago to help both parents and children with the psychological aspects of childhood cancer. From the start, several members of the unit have comforted the Greens and explained many times all the facts about leukemia. They introduced the Greens to one of the many cured patients and his family. *Chad has received the warmly affectionate care that has come to typify that unit.*

Why did the MGH bring the matter to court? Under the law the MGH had no choice. Does the MGH have many similar patients? Actually leukemia is a rare disease. Only 30 of 30,000 annual admissions to the hospital are for childhood leukemia. From the start one point was clear. Despite all the above facts the MGH was bound to be portrayed by some as a huge institution bullying two small people over the right to treat their only child. What is being fought for is the right of a child too young to choose life for himself to have a chance to live a normal, pain-free, drug-free life rather than to die a certain death. And for other Chads to have that same right.



MGH News

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Seeking Wider Uses for a New Area of Medicine

Effects of Polio Underline Danger of Apathy

A 10-year-old boy recently traveled several thousand miles to the MGH from his home in a Mayan jungle of Guatemala to obtain help against the crippling effects of polio.

Even in a hospital accustomed to providing specialty care for a large percentage of its patients, the appearance of a former polio victim as young as Yuri Doering was unusual.

Polio vaccines, used widely since the mid-1950s, have reduced the frequency of paralytic poliomyelitis in the United States from more than 18,000 new patients in 1954 to 18 in 1977.

To most Americans, polio has become extinct. Many no longer give any thought to what was a national scourge only a generation ago.

It was just eight years ago, however, that Yuri contracted polio.

The government of Guatemala had sent a medical team into Tikal, site of the country's most famous Mayan ruins, to inoculate the village children against the disease. Yuri missed receiving his shot because he was ill at the time with a viral infection and a fever. Ironically, he developed polio a month later.

Hospitalized in Guatemala City for nearly a year, the eldest of three children of the traffic controller for the tiny airfield at Tikal finally overcame his illness, but not before it destroyed virtually all muscle power in his left leg and created a lateral curvature of his spine (scoliosis).

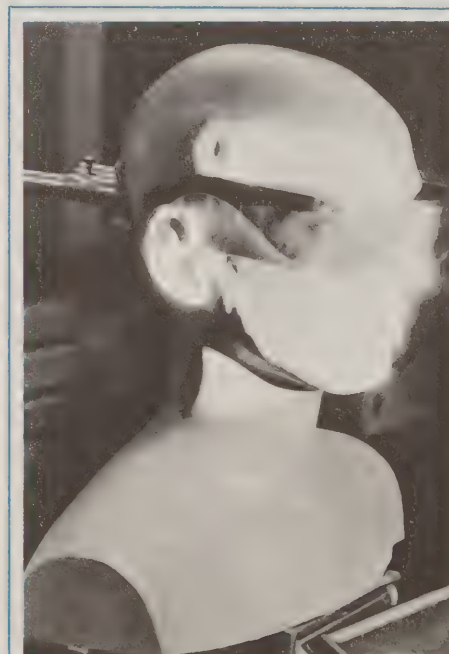
Yuri's MGH trip, made possible by the combined efforts of several people, not only enabled the boy to obtain the best that medicine can offer but also

served as a reminder of the devastating capabilities of polio.

Dr. Thomas C. Peebles, MGH pediatrician and Director of Education in the hospital's Children's Service, said the importance of immunizing all children, beginning in infancy, cannot be overemphasized if this nation is to continue free from polio.

He expressed concern over the results of a national survey conducted in 1976 which indicated that 38 percent of children ranging in age from 1 to 4 had not been vaccinated. The rates for

(Continued on Page 2)



Simulated solar rays are focused on sun glasses worn by mannequin so that protective capability of glasses, used after taking light-sensitive drugs, can be measured.

One year ago this month 16 medical centers in the United States confirmed the effectiveness of a treatment for psoriasis, a hereditary skin disease plaguing eight million Americans.

An 18-month cooperative trial of a procedure first reported by the MGH in the *New England Journal of Medicine* in December 1974, showed that previously stubborn psoriasis cleared in 90 percent of patients who completed the treatment.

The program signaled the birth of a new field of medicine, so new that the MGH developers (Drs. John A. Parrish, Thomas B. Fitzpatrick, and Madhukar A. Pathak) coined the word *photochemotherapy* (literally light, drug, treatment) to describe it. The key is a special artificial ultraviolet light source.

Pleased by the findings of June 1977, reported in the *Journal of Investigative Dermatology*, members of the MGH Dermatology Service have since become even more enthusiastic about the prospects for this form of medical care which employs the new artificial light source in combination with an ancient drug.

Since completion of the psoriasis trials, MGH investigators have used photochemotherapy to combat other skin ailments with apparent initial success. There are also indications that similar forms of therapy may one day help in treating various internal disorders, including blood diseases and some forms of cancer.

"The concept of giving medication systemically and then triggering it off in a specific part of the body with some outside agent such as light may hold great potential," said Dr. Parrish.

(Continued on Page 4)



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EDITORIAL:

No Wonder the Public Gets Confused

One of the more baffling aspects of science is the scientific method itself. The means that are used to prove, for example, whether a treatment works are logical. Nevertheless, the method can get complex when ethical issues become entangled.

Reduced to its simplest terms, the technique involves first an idea (hypothesis). Let's say that a doctor observes that two of his patients recovered in record time from the measles. In talking to the parents, he learns that both children had chanced to drink several glasses of quinine water the first day they had broken out in the rash typical of the disease. By the next day the rash and fever were gone, and the boys were symptom free. "Aha," thinks the doctor, "maybe quinine water cures measles."

Here the situation is relatively simple. Standard care for a child developing measles is to treat the symptoms. While a vaccine can prevent measles, no cure exists except time itself. Therefore there is no proven curative treatment to withhold while testing the doctor's idea or hypothesis that quinine water cures measles. Another important factor is that quinine water is known to be safe. Finally, measles is rarely fatal.

Intricate, exacting techniques would be required to make certain whether quinine water works or fails. First, they would involve comparing quinine water's effectiveness with that of a placebo, in this case a quinineless drink that is made to look and taste like quinine water. Second, if a treatment that significantly shortened the course of measles were available, that too would be compared with quinine water. Varying stages taking years are needed for such scientific investigation. Few of the thousands of suspected "cures" stand up under such scrutiny. But in the hope of finding improved ways of fighting disease, doctors continue to test whatever looks promising.

Suppose that instead of measles, the disease in our example were a form of cancer. Let's say that particular form had a treatment which cures half the patients. Now let's say that the doctor wanted to test quinine water's effectiveness against that type of cancer. This time he has a problem. To establish the effectiveness of quinine water, he would have to withhold the proven cure from part of his test group of individuals with that particular kind of cancer and substitute quinine water. Under these circumstances, such research would be highly unethical. No physician could justify experimenting on humans with an untested treatment when its failure would result in the death from the disease of all the patients on whom it was tried. Not when with accepted therapy there is known to be a 50 percent cure rate for that form of cancer. Years of carefully documented and successful animal studies would first be in order. Then a few meticulously carried out human trials. Then more widespread trials. Even this hypothetical situation has been oversimplified. No wonder that in the real world the public gets confused.

Plastic Braces Offer Polio-Crippled Boy Hope for Future

(Continued from Page 1)

infants and young children in disadvantaged urban and rural areas were even more disturbing.

"This represents a continuing threat," said Dr. Peebles, who is also Associate Clinical Professor of Pediatrics at Harvard Medical School. "Children transmit disease more readily than adults."

Another danger, he pointed out, is that many people move to various areas of the country without medical records which would indicate whether they had received adequate polio protection.

"Record-keeping is so important," he said. "Either people should have their own records, or there should be a central storage place for them."

While the risk of polio is generally very small in the United States today, the Center for Disease Control of the United States Public Health Service has issued a blunt warning that "epidemics are certain to recur if the population's immunity is not sustained."

Dr. Michael G. Ehrlich, Chief of Pediatric Orthopaedic Surgery at the MGH, said that Yuri Doering was the first former polio patient he had been called upon to treat in more than three years. The last such patient was 15 years old.

"The feeling in Yuri's left leg is normal, but he has no muscle strength whatever in the limb," Dr. Ehrlich said. "To stabilize himself while walking, he placed heavy stress upon the ligaments of his weak leg. By continually using that leg, he was gradually destroying it. As he moved along, his left side noticeably sagged more and more. Eventually he would have completely lost the ability to walk."

To specifications laid out by Dr. Ehrlich, who is also Assistant Professor of Orthopaedic Surgery at Harvard Medical School, the MGH Prosthetics and Orthotics Laboratory designed and constructed special braces for Yuri, the first of any kind he had ever worn.

Donald Brandolini, a specialist in

Photographs: Pages 1, 3, 4, Myron Daniels; p. 5 (upper), MGH Photo Lab; p. 5 (lower), Thomas McInnes; pp. 6, 7, 8, courtesy of Dr. R. Ted Steinbock.



Mrs. Deborah O'Brien, Technician in Pediatric Radiology, prepares Yuri Doering for X ray of his spinal problem.

orthotics, worked with Yuri to provide him with a long leg brace and a "body module" to support his spine. The technician fashioned both devices largely from polypropylene, a new type of light, tough plastic.

The leg brace was light enough to permit the boy to swing his leg without difficulty, yet strong enough to support his weight.

Dr. Ehrlich said that the muscles in Yuri's left leg were so weak that if he had been equipped with an old, conventional, heavy brace he would have had to drag the leg.

The body brace, which Dr. Ehrlich termed "another blessing of the plastic age," will prevent the spinal curvature, now at 15 degrees, from worsening. He holds every hope that at maturity the youngster will have a straight spine.

Without the special support, the curvature would become so severe that Yuri would be unable to stand and would likely incur serious lung impairment.

During annual visits that Yuri will have to make to the MGH for adjustment of his braces, Dr. Ehrlich will record detailed growth measurements. In a few years he will be able to predict the exact rate of growth of the boy's leg bones as well as his ultimate height.

"Yuri's weak leg is a little over an inch shorter than the normal one," the

doctor said. "Without intervention, the afflicted limb might wind up two or three inches shorter than the other.

"Once I can predict the growth rate, however, I can take measures to either slow the development of the normal leg or lengthen the weak one so that by the time Yuri stops growing both legs will be even.

"At that time I might also consider fusing the left knee so that Yuri no longer would need braces to help him walk."

Tikal, where Yuri grew up, is a village of only 300 (mostly descendants of Mayan Indians) deep in the steaming jungles of northern Guatemala. The route leading the child from remote Guatemala to the MGH touched the lives of several people.

The chain of events began to unfold a few years ago when John J. Roche of Cambridge, Mass., an attorney with the prestigious Boston law firm of Hale and Dorr, viewed the celebrated ruins of the Mayan civilization which flourished in Tikal between 200 and 900 A.D.

During his visit, Mr. Roche met Yuri's parents and, after becoming acquainted with the boy's problem, offered to do what he could for him.

Financing the long journey to Boston for Yuri and his mother, Mrs. Otto Doering, and for the medical care to follow was a tall order, but eventually Mr. Roche found a sympathetic listener in United States Sen. Harry F. Byrd, Jr., of Virginia.

Senator Byrd was trustee of a char-

itable foundation established in memory of Miss Annie J. Bronson, who served for many years as secretary to a Harvard Law School professor, John M. Maguire.

Through a combination of wise investments and frugal living, Miss Bronson built a substantial estate. Her original thought was to leave her entire fortune upon her death to the United States Government to help "reduce the national debt." At that time, however, such a bequest was illegal.

Subsequently, because of deaths in her family from cancer, Miss Bronson had a will prepared leaving part of her estate for medical research. She also named Senator Byrd to receive certain stockholdings "to be used by him as he deemed to be in the best interests of the United States, subject to no formal trust nor to any accounting to any governmental agency."

After Miss Bronson's death about five years ago, the senator created the Bronson Foundation with the funds left to him by her.

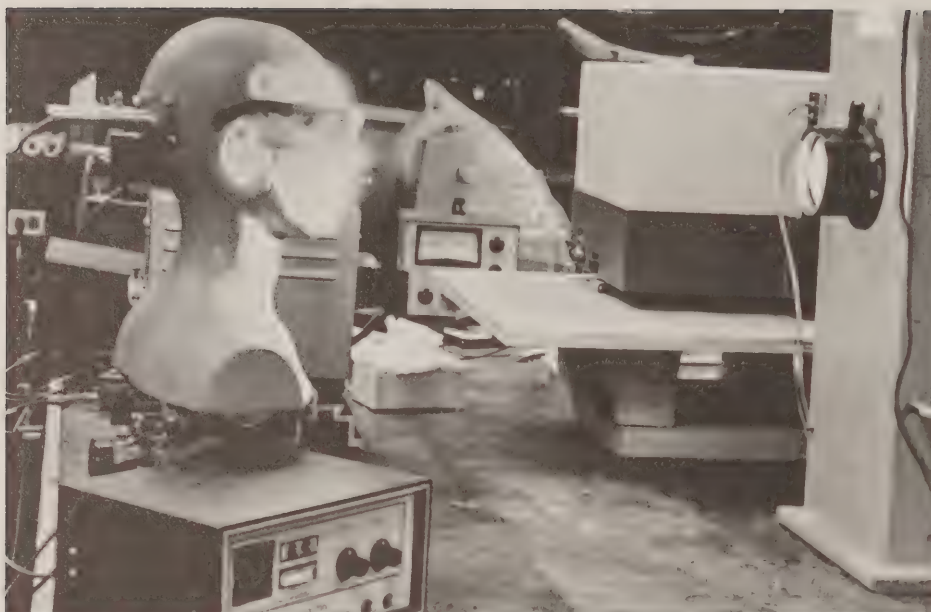
When Senator Byrd gave the go-ahead to use Foundation income to benefit Yuri, Mr. Roche and Miss Carol Boyd, a teacher of Spanish at the Needham, Mass., High School, made arrangements for the boy's visit. Miss Boyd had met the Doerings a year and a half ago during a trip to Tikal.

Dr. Robert N. Ganz, an MGH pediatrician, put Mr. Roche in touch with Dr. Ehrlich. Miss Barbara J. Zenn, of

(Concluded on Page 6)



Donald Brandolini, Orthotics Specialist, takes final measurements in fitting Yuri with body brace designed to help correct spinal curvature. Yuri's mother looks on.



Probe at back of mannequin's head relays to measuring instrument (photodosimeter) the amount of high-intensity light that passes through sun glasses from xenon arc lamp. Photochemotherapy patients must wear protective sun glasses for several hours after treatment.

Light Activates Drug in Photochemotherapy

(Continued from Page 1)

Two physicists, Richard (Rox) Anderson and Charles Comeau, are directing studies in the hospital's Photobiology Laboratory on how to measure the penetration of light into the human body.

Using special optical detection equipment in conjunction with excised skin, the investigators determine the penetration of various wavelengths of light.

Dr. Fitzpatrick, Chief of the Dermatology Service, said:

"Such studies would determine, for example, how much radiation would be needed to reach various organs. We maintain an optics laboratory where we can design any mode of light for this work."

In another MGH setting, a team

under Dr. Pathak is exploring the potentials of several light-sensitizing agents, including oral administration of the drug 8-methoxypsoralen, used in photochemotherapy of psoriasis. Dr. Pathak is renowned for his knowledge of psoralens and light.

Extracted from a plant that grows along the Nile, psoralens were used by ancient Egypt and India in conjunction with sunlight to treat vitiligo, a condition resulting in white patches of skin. In the United States, Dr. Fitzpatrick's group and dermatologists at Yale also began using the drug for this purpose in 1952. The sun with its undependability, however, proved an unreliable source.

Working with the MGH, G.T.E. Sylvania developed the high-intensity,

longwave, ultraviolet source employed with psoralen against psoriasis and then against related skin diseases. The light produces only that portion of sunlight which with psoralen is effective against diseases such as psoriasis.

Dr. Parrish said that the drug hematoporphyrin may some day prove useful in treating internal malignancies. Studies at other institutions have demonstrated that the drug concentrates in tumor tissue.

"If you let the tumor absorb the medication and then shine a beam of special light through the skin to activate the drug within the growth, you might then be able to kill the tumor cells," Dr. Parrish explained. "Some evidence already has been gathered to support that concept."

Roswell Park Memorial Institute in Buffalo, N.Y.; the Mayo Clinic in Rochester, Minn.; and Columbia Presbyterian Medical Center in New York City, as well as several other institutions, including the MGH, are studying the potentials for hematoporphyrin.

A commonly used antibiotic, tetracycline, has entered the MGH research as a result of studies demonstrating that several forms of this drug can sensitize cells to light. Thus, tetracyclines, too, may one day be useful in treating some internal problems.

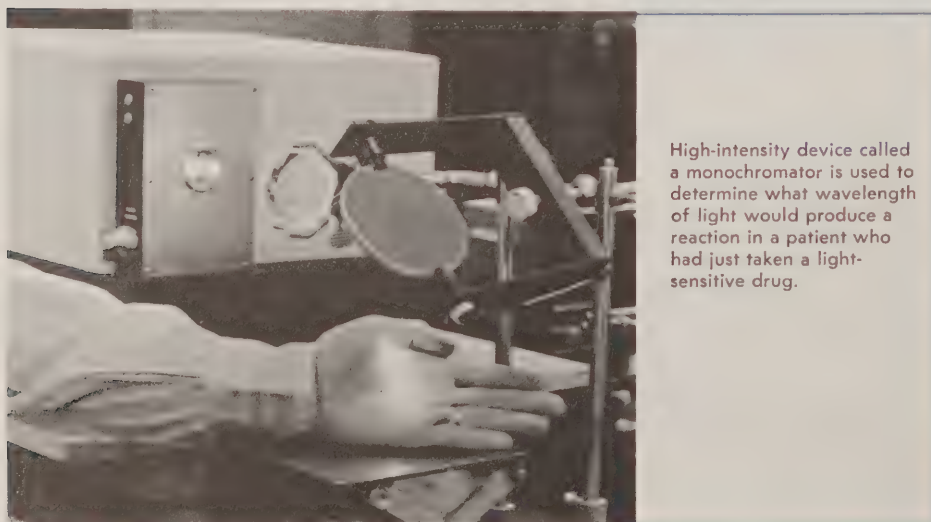
MGH investigators already have proven that the psoriasis treatment, called PUVA (Psoralen plus UV-type A), can influence the function and life span of lymphocytes, white blood cells which comprise an integral part of the body's immune system.

"Increasing or decreasing the immune function of these cells might make it easier to treat certain conditions," said Dr. Parrish, who is also an Associate Professor of Dermatology at Harvard Medical School.

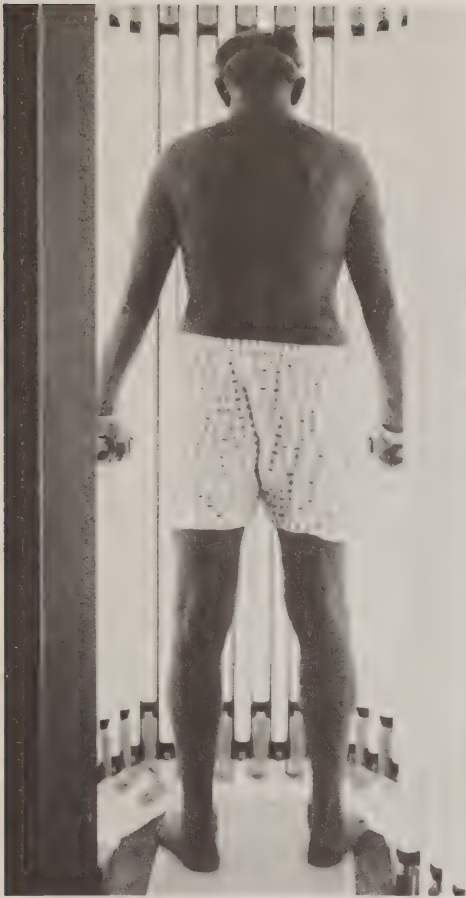
"We have assigned an entire laboratory team under Dr. Warwick L. Morison, working with Dr. Kurt J. Bloch, to learn what can and cannot be done with lymphocytes in humans."

Investigation of the dramatic possibilities of applying photochemotherapy to internal diseases commenced even as the use of PUVA to treat a number of skin disorders other than psoriasis produced encouraging results.

Dr. Morison supervised the treatment of 15 patients suffering from atopic dermatitis, one of the severest forms of generalized eczema. Scaling of the skin and extensive itching are hallmarks of the disease.



High-intensity device called a monochromator is used to determine what wavelength of light would produce a reaction in a patient who had just taken a light-sensitive drug.



Photochemotherapy booth for skin disease treatment. Exposure to high-intensity, longwave, ultraviolet light follows taking of medication.

After 20 to 60 PUVA treatments, all 15 patients showed improvement. Their eczema had been so severe that no other form of therapy helped. To demonstrate the effectiveness of PUVA, some of the patients volunteered to be treated initially on only one side of their bodies. After results were recorded, the other side received treatment.

To keep the skin clear after elimination of eczema, a patient must be followed with an aggressive maintenance schedule of PUVA treatments.

In a program directed by Dr. Fitzpatrick, the previously mentioned patchy skin disorder, vitiligo, yielded to PUVA in 70 percent of patients. But the number of treatments required to effect benefits ranged from 100 to 400.

In vitiligo, the white spots appear on the skin where pigment cells are missing. Occurring most often in otherwise healthy people, the disease nevertheless is being noticed increasingly among individuals with thyroid disease, Addison's disease, pernicious anemia, alopecia areata (localized, patchy loss of hair), adult-onset diabetes, and in persons with a family history of vitiligo.

Corticosteroids can restore pigmentation, but atrophy (progressive thinning of skin) that may occur during

repeated treatment of large areas makes such a regimen less than satisfactory.

In addition to treating patients at the MGH for vitiligo, the hospital is conducting a study in India which involves 350 patients with the disorder.

Codirecting the work are Drs. Fitzpatrick, Parrish, and Pathak.

Two or three times a year, MGH dermatologists encounter a patient suffering from a rare malignant skin dis-

ease called mycosis fungoides, a condition involving blood cells which live in the skin (lymphohistiocytic cells).

Mycosis fungoides is characterized by red plaques, scaling, itching, sometimes even tumors, and is very difficult to treat successfully in advanced stages. In early, or moderately advanced, phases of the disorder, however, 12 patients, including some unresponsive to conventional treatment, benefited from PUVA.

Other treatments, such as the use of nitrogen mustard, are effective against early symptoms of mycosis fungoides but, unlike PUVA, most have severe side effects.

As with eczema, the clearing of mycosis fungoides with PUVA required 20 to 60 treatments and a strict follow-up program of maintenance therapy. Dr. Barbara A. Gilchrest, now at Beth Israel Hospital in Boston, supervised this study.

PUVA also was used to combat a rare disease called "polymorphous light eruption," an allergy to sunlight which leaves a rash in place of a sunburn. Of 12 patients given 10 to 40 treatments, the condition of more than 90 percent improved.

PUVA failed to alleviate one very common skin condition. Ten patients were treated for 10 weeks for severe acne, an oil gland disturbance which leads to an eruption of pimples. Although some patients tanned a bit and appeared to look better, a close examination verified that they did not benefit from PUVA.

(Concluded on Page 6)



Patient with severe psoriasis, left, is shown recovered, right, following photochemotherapy.



Dr. R. Ted Steinbock poses with dinosaur arm bone which he helped to recover from rock formations dating back 100 million years in northern Wyoming. Bone is encased in plaster for protection.

Bones Can Uncover Detailed Knowledge About Ancient Man

To determine the age of a fallen tree, one needs only to count the growth rings within the trunk. Each ring signifies a year of life. The width of each ring also varies according to the climatic conditions of that period.

Similarly in humans, bones often develop markings that convey important information about the lives of people.

Contrary to a common belief that it is an inactive substance unaffected by the external environment, bone is composed of living cells within a hard framework (matrix). The cells are sensitive to such influences as injury, infection, mechanical stress, nutrition, and tumors.

During the growing years from infancy to 18 or so, lines may appear across certain bones following periods of inhibited growth caused by malnutrition or disease.

Such childhood illnesses as measles,

Several Skin Ailments Yield to New Care

(Concluded from Page 5)

The multipronged studies to assess the potentials of photochemotherapy are moving forward even though the use of PUVA in treating psoriasis remains officially in an investigative stage.

"PUVA does not cure psoriasis, and without maintenance therapy the disease may return," Dr. Parrish said, "but the treatment is clearly effective. This has been confirmed repeatedly by independent studies. The MGH Phototherapy Unit, directed by Dr. Mark LeVine, administers an average of 50 PUVA treatments daily."

The treatment could become widely available only after federal Food and Drug Administration approval for rou-

tine use and after the manufacture of sufficient artificial lights.

Yet to be ascertained, however, is whether PUVA may produce long-term side effects in patients. Financed by the National Institutes of Health, a five-year follow-up is being conducted among some 1,300 PUVA patients who participated in the 16-center trials and another 400 such patients treated at the MGH by Drs. Parrish, Fitzpatrick, and Ernesto Gonzalez, present Chief of the Dermatology Clinic.

Animal studies cause concern that cataracts, skin cancer, and premature aging of the skin might become offshoots of PUVA, but Dr. Parrish stressed, "We have no evidence to date

of any of these side effects in humans despite the fact that the drug has been used for other purposes in the United States for more than 25 years and in India and Egypt for several hundred years."

The only short-term side effects, such as sunburn or nausea, have been minimal.

Dr. Parrish concluded:

"We think that PUVA is a good example of photochemotherapy, but we want to look simultaneously at other forms. We think the concept is more exciting than a particular single application."

Polio

(Concluded from Page 3)

the MGH Social Service Department, arranged quarters for Mrs. Doering and her son at a Beacon Hill guest house which especially welcomes Spanish-speaking visitors from Central and South America. Miss Zenn also helped to serve as an interpreter for the Doerings at the hospital.

Some of the technological marvels of America have appealed to Yuri. His

eyes widened at such sights as doors that opened by themselves. When Miss Zenn treated him to his first ice cream sundae, his face shone with delight.

In aiding Yuri, Senator Byrd not only carried out the purpose of the Bronson Foundation but, it may be fair to say, he also acted in the best interests of the United States.

He drew much needed attention to the fact that the effects of polio are still being felt and that no one can afford to lower his guard against the disease.

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whooping cough, influenza, or chicken pox can produce these markings known as "transverse lines." They may also indicate times of starvation, such as during bleak, winter months.

Paleopathologists, who study diseases in ancient man, employ transverse lines as one of many guidelines or tools to help them assess the health and lifestyles of populations of long ago.

One such specialist is Dr. R. Ted Steinbock, who has spent the past year in training at the MGH as a medical resident.

Fascinated during his boyhood by the secrets that ancient bones may conceal, Dr. Steinbock interspersed his high school studies with research on the 5,000-year-old remains of Indians who once lived in his home state of Kentucky.

From high school, he entered Harvard College as a sophomore and focused on two professions which he felt made a perfect blend — radiology and paleopathology.

While a junior at Harvard, Dr. Steinbock squeezed in a course in paleopathology at the Smithsonian Institute in Washington. He later wrote a senior thesis on the subject, earning highest honors.

By the time he was a college senior, he had researched the bone collections of several museums, studying specimens ranging from Egyptian and Peruvian mummies and Eskimo skeletons to the Pueblo Indians of New Mexico and leprosy victims from Medieval Denmark.

These and other investigations, in-



Destructive bone changes in the hands and feet are prominent features of severe leprosy. Photo shows foot bones of a leper from Medieval Denmark.

cluding a series of archeological digs, led to expansion of the honors thesis into a 440-page book, *Paleopathological Diagnosis and Interpretation*. It was published in 1976 when Dr. Steinbock, then 24 years old, was a fourth-year student at Harvard Medical School.

In his volume which he illustrated himself, Dr. Steinbock offers a systematic approach to diagnosing lesions in excavated bones and interprets the significance of such diseases in ancient peoples.

Studies of transverse lines and other bone lesions in the Archaic Indians of Kentucky, for example, indicate that they had an average life expectancy of

only 36 years. Most likely, they were nomadic hunters, frequently forced to sleep on cold, damp ground. Probably as a result, most suffered from arthritis which apparently developed in early life.

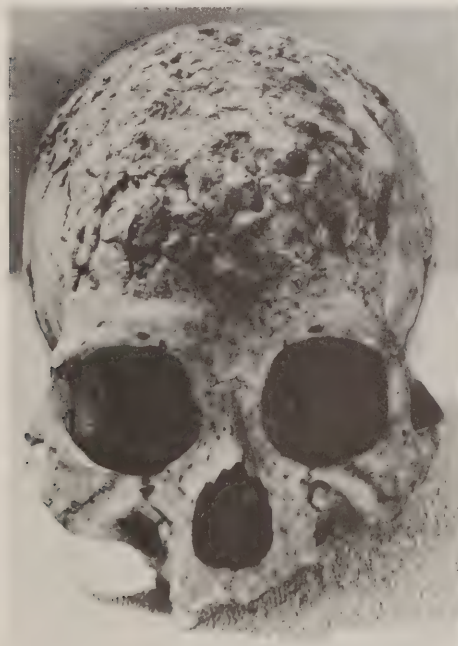
They were particularly prone to dental disease. Mussels which they ate after collecting them along the river banks contained sand which eroded their teeth past the enamel into the pulp.

Numerous transverse (or growth arrest) lines were found in the thigh bones (femurs) of 34 Indians who lived in California some 4,000 years ago. The evidence bolstered a belief that they endured seasonal starvation during the winter months and then enjoyed good nutrition during the salmon runs that followed.

As cultures dependent on hunting and gathering berries and nuts for subsistence gave way to an agricultural environment, a marked change took place. With the new type of existence, people lived longer, and the incidence of long-bone fractures decreased.

Many authorities have maintained that syphilis, which leaves its mark on bone, was carried to Europe from the New World by Christopher Columbus and his crew when they returned to Spain in 1493.

During epidemics that erupted in Europe, the English referred to the disease as the "French pox." The French called it the "English pox." It was the "Italian pox," according to the (Concluded on Page 8)



At left, skull of an Eskimo woman from St. Lawrence Island, Alaska, (500-1700 A.D.), shows evidence of cranial syphilis. Irregular growth of new bone gave top of skull a wrinkled appearance. At right, skull of pre-Columbian Peruvian woman exhibits multiple myeloma, the most common primary malignant bone tumor.





People of Old Often Misinterpreted Diseases

(Concluded from Page 7)

Spanish, and the "Spanish pox" as far as the Italians were concerned. Ultimately, many accusing fingers were pointed at America's Indians.

A major reason for this was the discovery of "guaiac," a kind of wood, as a treatment for syphilis. There was a saying that "God always provides a remedy where he inflicts a disease." Therefore, it was postulated, since guaiac came from the New World, the disease must have originated there as well.

"I agree that syphilis was present in the New World before Columbus," said Dr. Steinbock, "but I believe that the disease, either in venereal or non-venereal form, also was present in the Old World for centuries before Columbus."

He pointed out that literature published long before the days of Columbus contained many references to "venereal leprosy" in the 13th and 14th centuries.

"Leprosy is never spread sexually

or congenitally," he said, "but both of these features are prominent in syphilis.

"Also, for thousands of years, the Chinese and Arabs used mercury rubs and inhalations to treat leprosy. In reality, mercury is ineffective against the disease but at one time was a mainstay in treating syphilis."

Common in Europe during the Middle Ages, leprosy apparently was transported there from the Middle East by the Crusaders in 1,000 A.D. Centuries earlier, the army of Alexander the Great may have carried the disease to the Middle East from India.

"Leprosy was not as infectious as most people thought, however," Dr. Steinbock remarked. "It was not really necessary to isolate lepers, in many cases almost leaving them to die because of their disease."

Studies of ancient populations, including people who lived into their 60s and 70s, indicated a very low frequency of malignant tumors.

"When you compare that with today's high incidence," the young phy-

sician commented, "you think immediately of the possibility of cancer-causing substances from industry, pollution, or additives in the food that we eat.

"Still, the people of old were plagued with other conditions: severe dental problems, infections for which there were no effective treatments, and all types of chronic diseases, many of them quite debilitating at the time."

In parts of Africa, native medicine men still practice trephination, one of the earliest surgical procedures involving the skull. They remove part of a patient's skull without damaging the underlying membranes (meninges) and brain in order to ease intracranial pressure from a severe fracture, relieve headaches, or, in some cases, let out "evil spirits."

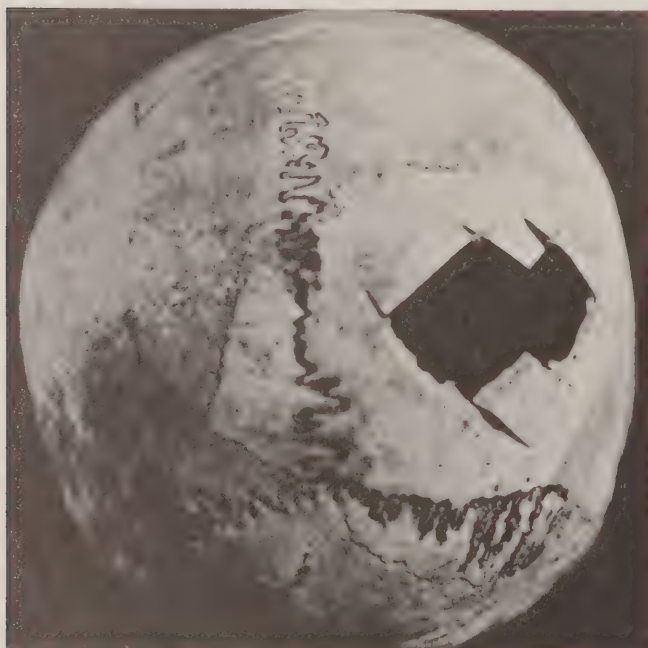
Trephination was once practiced in most areas of the world but flourished particularly in Peru between 500 B.C. and 500 A.D. Of more than 1,000 trephined skull specimens uncovered, a greater number have been found in Peru than in the rest of the world combined.

Despite lack of anesthesia and antiseptics, the operation had an impressive recovery rate. A study of 214 trephined skulls showed complete healing in more than 50 percent and partial healing in another 16 percent.

During the coming year, Dr. Steinbock plans to serve as a general physician among 8,000 Zuni Indians living on a reservation in western New Mexico. The tribe has occupied the same land for 2,000 years.

When not treating patients, the doctor intends to study the Zuni medicine men and perhaps write a book about their tribal customs and rituals. He is also working on a second edition of his first volume, *Paleopathological Diagnosis and Interpretation*.

From New Mexico, Dr. Steinbock intends to return to the MGH to pursue three years of residency training in radiology.



Cutting a hole in the skull for such purposes as easing pressure from fractures, relieving headaches, or letting out "evil spirits" was once a common practice. The recovery rate from the operation, called trephination, was surprisingly high.



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Freezing Destroys Certain Types of Skin Growths

Seeking New Ways to Trace Brain Disease

How does the brain function? While the brain cells of most people perform normally throughout their lifetime, why do the cells in other individuals deteriorate?

Research to provide a better understanding of how the brain operates and hopefully turn up clues to a variety of hereditary and degenerative diseases is accelerating in the MGH Neurology Service.

The newest investigation concerns chemical "releasing factors" in the brain that regulate the endocrine glands through the pituitary, or so-called master, gland.

Recent studies have indicated that in addition to neuroendocrine control these substances also play an important part in the function of the brain itself.

The question then arises: Would a disorder of these chemical agents provide a tip-off to the source of a neurological or perhaps even a psychiatric disease?

The releasing factors are molecules comprised of a chain of at least 2 and as many as 25 amino acids, frequently called the building blocks of protein. The factors are also referred to as peptides.

They are produced primarily by the hypothalamus, the portion of the brain that governs temperature, hunger, thirst, and the like. The hypothalamus also serves as the seat of the emotions such as fear and anger.

The peptides travel to the pituitary to stimulate the manufacture of certain hormones. These are then distributed to the thyroid and adrenal glands as well

as the testes, ovaries, and pancreas to cause other hormones to be made for specific roles in the body.

The hypothalamus is not the sole producer of peptide substances. They are also believed to have ancient origins elsewhere in the brain with missions unrelated to neuroendocrine control.

Investigators have discovered, for example, that the brain appears to make its own morphine, or pain-relieving, peptides.

"We're engaged in a number of projects to map peptide distribution in the human brain," said Dr. Joseph B. Martin, who on July 1 became Chief of the MGH Neurology Service. "Finding out where the peptides are located in
(Continued on Page 4)



Applying liquid nitrogen to destroy certain skin tumors can be done quickly, easily, and safely.

Each year hundreds of people visit a clinic in the MGH's Cox Cancer Center to have dermatologists remove a variety of skin tumors.

The vast majority of the cancers either pose no threat to life or are in a very early state of malignancy. In most instances complete recovery can be assured.

Removal of the growth may be through surgery, X-ray radiation, or dehydration of tissue by using a high-frequency electrical current (electrodesiccation) in conjunction with scraping (curettage).

Or, the specialist may elect to employ a relatively new technique involving liquid nitrogen—a supercold substance—to destroy the tumor.

The cost of this increasingly popular mode of treatment, aptly called cryotherapy (kryos in Greek means icy cold), is less than that of surgery or X ray and probably less than that of electrodesiccation and curettage, particularly in terms of the time required of the patient and the physician.

When the treatment involves a non-spreading tumor or a malignancy in its early stages, MGH dermatologists consider cryotherapy to be equally as effective as the other methods.

"The volume of patients coming to the Skin Tumor Clinic called for some kind of methodology that was not only effective and safe but also relatively easy and quick to apply," said Dr. Howard P. Baden, the clinic's Director. "Cryotherapy does not require an elaborate facility and does not tie up auxiliary personnel."

During each of its weekly sessions, the clinic is visited by an estimated 40
(Continued on Page 2)



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EDITORIAL:

Caring for Neurologic Problems

One of the most exciting new areas of research has been the discovery in the brain of several new types of substances known as peptides. Many believe that the brain itself makes the substances to control its own activities. One such kind of peptide, for example, is the antipain agent, called enkephalin which acts locally in the brain like morphine. Does the brain thus produce its own pain killers? This is just one of the intriguing possibilities suggested by the findings.

Exploring this frontier are investigators at several medical centers and at organizations like the Johns Hopkins Medical School and the National Institutes of Health. Among the leaders in the field is Dr. Joseph B. Martin, the new Chief of the MGH's Neurology Service. A page 1 article about Dr. Martin describes some of the information being discovered about peptides.

As fascinating as this field of research is, it represents only one facet of Dr. Martin's interest. As Chief of the Neurology Service, Dr. Martin will supervise physicians who, like him, are superb in caring for patients. The service has also been noted as an outstanding place for young doctors to learn under the guidance of highly skilled neurologists.

More than any other individual, the man responsible for the reputation of the Neurology Service has been its Chief of 27 years, Dr. Raymond D. Adams. Dr. Adams, who will continue to serve the hospital, has been known for his investigative capacities and skill in delving into a myriad of confusing symptoms. His educational abilities are most eloquently described by the fact he has taught more than 200 young physicians who have themselves gone into academic medicine and more than 25 who have become neurology department heads in other medical centers throughout the world.

The MGH is fortunate that Dr. Adams, a man who remains youthful, will continue to treat the sick. The hospital and its patients are also blessed to have found in Dr. Martin an extraordinary successor as Chief. As is the case with the new findings about the brain's biochemistry, it is much too early to predict the course the MGH Neurology Service will take in coming years. All the peptides, however, seem to be in proper sequence to benefit the patient.

Low Cancer Return Demonstrates Value Of Ultracold Liquid

(Continued from Page 1)

patients, some for continuing treatment. Liquid nitrogen is used in the care of about 35 percent by the clinic which embraces a cross-section of medical and surgical specialties.

Reporting in the *Journal of Dermatologic Surgical Oncology*, Dr. Baden and three colleagues, Drs. David I. McLean, formerly of the MGH and now of the University of British Columbia; Harley A. Haynes, now of Peter Bent Brigham Hospital in Boston; and Philip L. McCarthy, of the MGH, cited a study which demonstrated the reliability of cryotherapy.

The investigators reexamined on several occasions 56 patients who had been given liquid nitrogen in the MGH Skin Tumor Clinic to treat a total of 177 basal-cell carcinomas (cancers). At least two and as many as eight years had passed since the treatments. Only four of the cancers recurred, a rate of somewhat less than 2.3 percent.

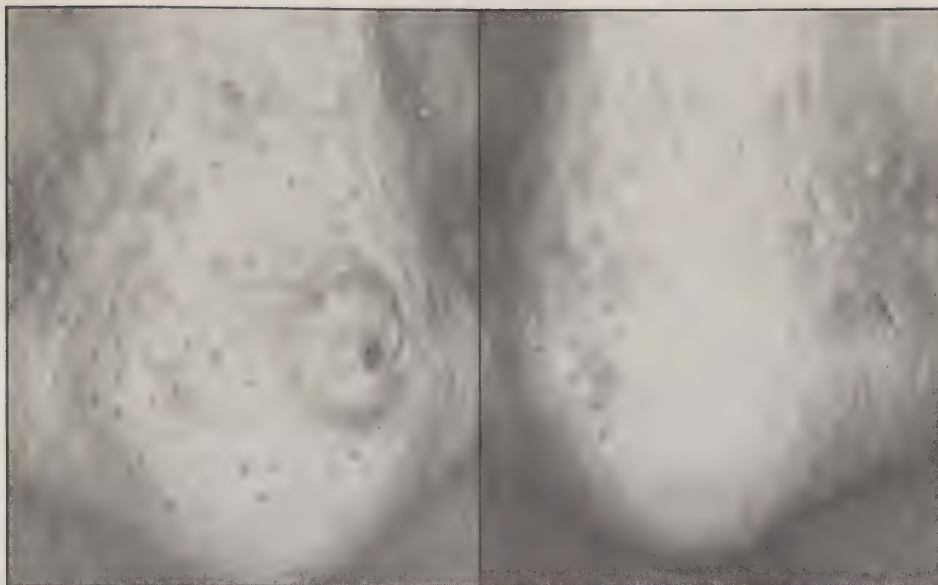
Sixty-one percent of the tumors had been on the head and neck, 23 percent on the trunk, and 16 percent on the limbs. All of the recurrences appeared on the head.

The *Journal* article suggested that the absence of vital structures on the trunk and extremities may have led to more aggressive treatment in those areas. Also, it said, the fewer blood vessels present, compared to those of the face, may have resulted in deeper and colder freezes.

A Springfield, Mass., dermatologist, Dr. Setrag A. Zacarian, who trained at the MGH, helped to open the field of cryotherapy in skin disease. His work included designing instruments needed for application of the liquid chemical which has a temperature of minus 196° Centigrade.

Dr. Haynes later studied the concept when he directed the MGH Skin Tumor Clinic, and he interested Dr. Baden and other colleagues in the procedure. Together they refined techniques to

Photographs: Pages 1, 5, 6, 8, Myron Daniels; p. 3, courtesy of Dr. Howard P. Baden; p. 4, Christopher Bullock; p. 7, Joel Salhanick.



Nose at left exhibits basal-cell carcinoma. At right, the same nose following treatment of tumor with liquid nitrogen.

assure optimal use of cold in attacking tumors.

Most commonly treated with liquid nitrogen, after the customary diagnostic procedures (biopsies), are the basal-cell carcinomas. Although usually the least harmful form of cancer, they can generate tremendous amounts of destruction.

Another form of skin cancer, squamous-cell carcinomas, are considered for freezing only if still in an early, superficial state. "If they showed any evidence of invasion," Dr. Baden said, "they would have to be removed surgically."

More than 95 percent of basal-cell and squamous-cell cancers are attributed to excessive exposure to the sun's ultraviolet rays.

Dr. Baden, who is also Professor of Dermatology at Harvard Medical School, said the sun-caused lesions respond equally well to cryotherapy, but he emphasized that the squamous-cell type can also be produced by other means, such as X ray, arsenic intoxicification, or burns.

"These have a much greater tendency to spread," he said, "so we don't generally treat them with liquid nitrogen."

A third type of skin tumor seen in the clinic is called Bowen's disease. Relatively uncommon and of various causes, it is a form of squamous-cell carcinoma which retains a superficial appearance for lengthy periods but does have the capability of spreading (metastasizing).

"We've probably given cryotherapy to 30 or 40 patients with Bowen's dis-

ease," Dr. Baden said. "There were no recurrences of the tumor."

Although various instruments were designed for use in cryotherapy, the basic tool is an uncomplicated device whose function is simply to squirt the nitrogen where it is needed.

"We freeze the lesion from the center, allowing the cold to spread about four millimeters [about one-eighth of an inch] from the periphery of the tumor," Dr. Baden explained. "Bringing the temperature in the tissue to minus 20 or 30 degrees is sufficient to achieve the desired killing action.

"The freeze must be followed by a thaw lasting a minute and 30 seconds. That time element would verify that we had reached the prescribed temperature level and that the killing process had penetrated to the desired depth."

Dermatologists exercise special care against overtreatment, but even if the thaw takes two or two and a half minutes and healing requires a few more days than expected, the cosmetic results are still quite acceptable.

"We've also learned from experience that we can obtain very nice healing on smooth surfaces, such as a nose, after cryotherapy," Dr. Baden remarked. "Hiding surgical scars on such surfaces would be difficult."

Generally, from the neck up, the skin possesses a tremendous regenerative capacity. On most other parts of the body, the skin tends to be much thicker, much less cellular, and prone to heavier scarring.

Routinely in judging whether to employ cryotherapy, dermatologists study

the anatomy of the region where the tumor is located. Are there arteries nearby which might rupture as a result of the treatment? Might nerves be frozen accidentally?

Still another possible reason to avoid cryotherapy: Will the patient be able to handle posttreatment requirements?

"We expect patients to experience some swelling, edema [accumulation of fluid], crusting, and perhaps a tiny bit of bleeding in the lesion," said Dr. Baden. "The condition may last anywhere from three days to a week and then continue at a slower rate for another couple of weeks.

"The patient may have to change dressings for three weeks, two or three times a day during the first week and once daily after that. If this is not possible because the patient either is too feeble or has no help in the home, then you have a reason not to use liquid nitrogen."

For an individual such as this, surgery might be the best course.

Some specialists also avoid using cryotherapy on scalp lesions because they tend to grow along the hair shaft and penetrate deeply into the scalp. Even after surgery, these lesions often recur. Some hair loss can also be expected.

On occasion, dermatologists encounter tumors that are almost a centimeter (.3937 inch) in thickness. Before being frozen, they have to be shaved down in order to assure penetration of the cold to the bottom of the tumor.

Very large growths are often treated in segments. A one-shot treatment of the entire tumor might create such destruction that healing would take a very long time. Using a little sterile ink, the physician marks the boundary of each small area after he completes work on it. Such a progressive procedure leads to reasonably good results.

Physicians turn to liquid nitrogen frequently to eliminate warts and enlarged blood vessels in the skin (hemangiomas). Ear, nose, and throat specialists use it to remove tumors from inside the mouth. Ophthalmologists find it valuable in treating cancers of the eyelid.

"Liquid nitrogen is inexpensive, relatively easy to handle, and very effective, with a predictable response and few complications," Dr. Baden said. "Although cryotherapy is not the most common method of treating growths in the skin, it certainly appears headed for increased use."

Specialists Link Up To Study the Brain

(Continued from Page 1)

brains which are without neurological disease is an essential primary task."

Early work by other laboratories on Huntington's chorea, a hereditary disease marked by progressive, irreversible brain damage, helped to spur the current investigation.

Dr. Martin said the studies suggested that some of the enzymes which convert peptides from one structure to another are disordered in those areas of the brain known to be affected in Huntington's chorea. This then is one disease being looked at as a clue to a possible relationship between a disarray of peptides of the brain and the illness itself.

Parkinson's disease is another example in which a neurotransmitter (in this case, dopamine) is deficient. The system that degenerates in Parkinson's disease also contains a peptide which may prove to be disarranged.

Dr. Martin came to the MGH to succeed Dr. Raymond D. Adams, who retired as head of the hospital's Neurology Service, and at the same time to become Bullard Professor of Neurology at Harvard Medical School.

Dr. Martin had been serving as Neurologist-in-Chief at the Montreal Neurological Institute, Professor and Chairman of the Department of Neurology and Neurosurgery at McGill University, and Senior Physician at Montreal General Hospital.

The research, which he transferred to the MGH, further strengthens a department already renowned for its treatment of neurological disorders, its studies of diseases of the nervous system, and the broad scope of its specialist training programs.

"To solve the problems of neurological diseases, basic neurobiologists and physicians primarily concerned with patient care must have a very close linkup," Dr. Martin declared.

"The basic scientist has the tools and the techniques while the clinician has the knowledge and the experience and can ask the right questions. We want the clinicians. We want the scientists. And we also want some people who can bridge the gap."

Dr. Martin intends to work closely with the MGH Neurosurgical Service in several areas.

At Montreal, he was very involved

As part of neurological examination, Dr. Joseph B. Martin tests patient's grasp reflexes.



in the study of pituitary tumors and the management of patients with this disorder. Dr. Nicholas T. Zervas, MGH Chief of Neurosurgery, has developed special expertise in pituitary surgery.

Dr. Martin and Dr. Zervas' predecessor, Dr. William H. Sweet, also have discussed plans for a possible joint study of peptides and their relation to pain.

In addition, Dr. Martin intends to develop strong collaborative efforts with Dr. John T. Potts, Jr., Chief of the MGH Endocrine Unit.

"The expertise in chemistry and synthesis of peptides which Dr. Potts' group has developed will be of great value to our research efforts," Dr. Martin said.

Meeting challenges, such as peptide research, head-on was a quality instilled in Dr. Martin at an early age by his parents.

"Although we lived in a tiny community of perhaps 500 people in rural western Canada, my parents always insisted on the very best that I could do," he said.

After graduating from high school, Dr. Martin embarked on a premedical program at the University of Alberta in Edmonton. His studies there, including a year of medical training, were interrupted by a year's attendance at Eastern Mennonite College in Harrisonburg, Va.

"I had developed some doubts about what I really wanted to do," he explained. "So I turned to the pure arts, studying ethics, philosophy, theology, and music at Eastern Mennonite College. That was one of my best years. For one thing, I met my wife, Rachel, in Harrisonburg."

He earned his baccalaureate degree there but decided anew that he wanted to become a physician, specifically a general practitioner, so he returned to the University of Alberta as a second-year student in its medical school.

Graduating in 1962 (first in his class), Dr. Martin quickly found himself under pressure from his mentors. Because he had done well academically, they felt he should direct his talents toward a medical specialty. His earlier interest in philosophy finally led him into neurology.

He spent his internship and residency years at the University Hospital in Edmonton and at the University Hospitals of Western Reserve University in Cleveland.

"It wasn't until I was well into my neurology residency that I began to think about academic medicine," he said. "I realized that to become established securely in an academic career at a time when science was tough and hard, further research training was im-

A Career of Expanding the Frontiers of Neurology

A prominent South American woman began to exhibit periods of weakness and forgetfulness.

"I start to do something, and the first thing I know I have done something else instead," she complained. "I can't seem to concentrate."

As weeks passed, minor chores left her exhausted. She walked with difficulty and relied upon her husband's arm to steady herself. Occasionally she lost control of her bladder.

Sometimes she would begin speaking and, halfway through a sentence, forget what she was saying. Where she once wrote as many as ten letters a day, she now found it an effort to write even one.

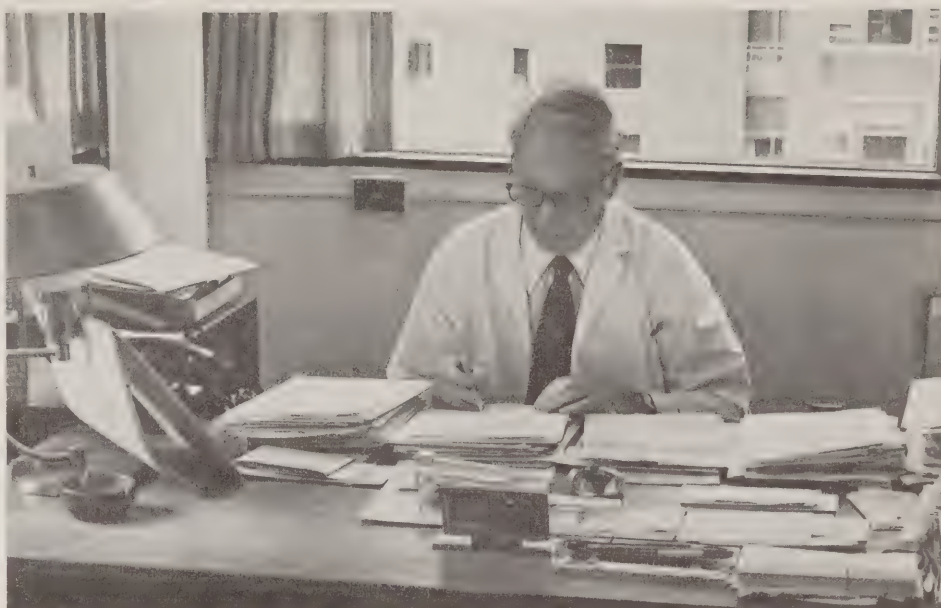
Finally, the woman lost all interest in the social and charitable activities she had enjoyed so much.

Doctors to whom she was taken in Bogota, Colombia, suggested that although she was only 63 years old, she could be suffering from senility.

Refusing to believe that, the woman's family brought her to the MGH to be examined by Dr. Raymond D. Adams, Chief of the Neurology Service.

After close study and a battery of tests, he concluded that his patient had not become senile but had developed "normal pressure hydrocephalus," a then unknown cause of mental deterioration.

Ventricles (chambers) in the brain that fill with spinal fluid had enlarged and were pressing upon delicate surrounding brain tissue, causing the



Dr. Raymond D. Adams tackles a mound of paperwork at his desk on "Kennedy 9."

symptoms that resembled the common complications of old age.

Because the ventricles could hold more than a normal quantity of fluid, tests of fluid pressure showed nothing amiss.

Dr. Adams called upon Dr. William H. Sweet, an MGH neurosurgeon, and together they agreed upon installation of a shunt, a tube to drain away the excess fluid and thereby reduce the "normal" pressure to even lower levels.

The results were startling. The patient became more responsive, walked without assistance, and made a rapid recovery. Three years later, tests of her

intellect indicated she was "superior" in memory and in both verbal and non-verbal aptitudes.

The incident, which took place some years ago, exemplifies the qualities of a physician who has dedicated his professional life to moving along the frontiers of neurology, trying to see where the next advances might be made.

During a medical career that so far has spanned 42 years, Dr. Adams has earned a worldwide reputation as an authority on neurological diseases and as an inspiring teacher.

A little more than a year ago, neu-
(Continued on Page 6)

portant."

On completing his patient-care training in neurology, he launched a three-year period of research at the University of Rochester, working with Dr. Seymour Reichlin, then Chief of the Endocrine Service at Strong Memorial Hospital.

Dr. Martin earned a Ph.D. in anatomy in 1970. He said he had registered as a student in that department because the clinical departments did not offer Ph.D. degrees.

"Actually, it was Dr. Reichlin who taught me how to do research," he said, "and we also developed a long-standing friendship."

Dr. Reichlin presently is Chief of Endocrinology at Tufts University Medical School in Boston.

During his professional affiliations in Montreal which began in 1970, Dr. Martin wrote more than 90 scientific publications.

He has written two books in collaboration with Dr. Reichlin.

The books are *Clinical Neuroendocrinology*, also coauthored by Dr. Gregory M. Brown of McMaster University in Hamilton, Ont., and *The Hypothalamus*, which included as co-editor, Dr. Ross J. Baldessarini of the MGH and now at McLean Hospital, a psychiatric division of the MGH.

Among numerous honors received by Dr. Martin was that of being named as Bowditch Lecturer to the American Physiological Society for 1978.

In addition to this Society he is a

member of the American Academy of Neurology, the American Society for Clinical Investigation, the Endocrine Society, and the Royal College of Physicians and Surgeons of Canada.

He also serves on the editorial boards of the *Journal of Clinical Endocrinology and Metabolism* and *Neuroendocrinology*.

Ever since college days, for relaxation, Dr. Martin has enjoyed playing and watching hockey, Canada's national sport.

Now residing in the Boston suburb of Belmont with his wife and their four children, aged 8 to 16, he will find that public enthusiasm for his favorite sport is nearly as great in his new environs as it is in Canada.

Dr. Adams Retains Busy MGH Schedule

(Continued from Page 5)

rologists and neuropathologists from throughout the United States and 17 foreign countries converged on the MGH to personally thank him for the direct role he had played in molding their own careers.

Some 200 former Residents, Fellows, and close colleagues of Dr. Adams assembled in the hospital's historic Ether Dome. During a two-day period, 89 papers depicting scientific contributions were read by their authors, all trained by Dr. Adams.

The scientific sessions were part of ceremonies marking his approaching retirement as Chief of the MGH Neurology Service since 1951 and as Bullard Professor of Neuropathology at Harvard Medical School since 1954.

Selecting a successor with the knowledge, skills, and experience to follow the examples set by Dr. Adams was not an easy task. "The MGH was fortunate to find Dr. Joseph B. Martin, who embodies the same standards of excellence set by his predecessor," said Dr. Charles A. Sanders, General Director.

Although Dr. Adams officially relinquished the leadership of the Neurology Service last July 1, he retired from only a few of the many activities in which he was engaged.

As a Senior Physician at the MGH, he plans to continue treating a number of patients, most from outside the country, who have called on him regularly.

He has been asked to stay on as Director of the Eunice Kennedy Shriver Center for Mental Retardation which

he helped to establish in Waltham, Mass., a dozen years ago.

He is also collaborating with Dr. Raymond N. Kjellberg, an MGH neurosurgeon, in a study of treating malformed blood vessels in the brain by using beams of protons (positive-charged atomic particles). And in conjunction with Dr. Robert M. Crowell, another MGH neurosurgeon, he is studying blood vessel occlusions (blockages) in animals.

Dr. Adams is also an editor of *Harrison's Principles of Internal Medicine*, one of the major textbooks on internal medicine which every medical student in the United States is exposed to.

Responsible for some 400 to 500 pages of text, he is currently working on a 9th edition of the volume.

Because of both an avalanche of new information and space restrictions in *Harrison*, Dr. Adams and Dr. Maurice Victor, Professor of Neurology at Case Western Reserve Medical School, coauthored a book entitled, *Principles of Neurology*.

Published last year, the book includes a lengthy discussion of neurologic as well as psychiatric syndromes (combinations of symptoms). The authors felt that all physicians, and neurologists in particular, should know something about the diagnosis and biological facts pertaining to the depressive illnesses, neuroses, schizophrenias, and personality disorders.

"We look upon the field of psychiatry as divisible into two major parts," Dr. Adams said. "One has to do with all of

the social maladjustments that occur in a complex society and which cause unhappiness, dislocation, criminality, and the like. The other major division has to do with the psychoses, the dementias, and the amentias [mental retardation]. All of these are diseases of the nervous system, and in our view they make up a large segment of neurology."

A section of *Principles of Neurology* is allotted to diseases of muscle which increasingly are coming into the purview of neurologists.

In collaboration with Drs. Derek Denny-Brown and Carl M. Pearson, Dr. Adams wrote *The Pathology of Muscle Diseases*, published in 1954. Representing the first attempt to collect and systematize all of the diseases of muscle, the book remains a leader in its field.

Speaking of Dr. Adams, Dr. C. Miller Fisher, an MGH neurologist and an associate for 30 years, commented:

"His knowledge is something that just can't be believed. And he has an insatiable thirst not only for knowing but also for instructing and writing. To him teaching is as natural as breathing.

"He has created here a veritable neurological institute, staffed mostly by people he has trained. The MGH has been the first choice of physicians for training in neurology and neuropathology for the last 20 years."

Originally interested in psychology, Dr. Adams obtained his baccalaureate and master's degrees from the University of Oregon and had just about completed his work for a Ph.D. when he decided to enter medical school.

Understanding the nervous system required a knowledge of its anatomy, physiology, and pathology and this, he felt, could be obtained only at a medical school.

Dr. Adams entered Duke University in 1933 as a medical undergraduate with an eye toward becoming a psychiatrist. But as time passed, he became increasingly attracted to internal medicine and neurology as areas of learning and investigation.

He wound up studying both specialties after receiving his MD in 1936. A Rockefeller Fellowship enabled him to train two years at the MGH, first in neurology under Dr. James Ayer, then in neuropathology and psychiatry under Drs. Stanley Cobb and Charles S. Kubik. He spent a third year at Yale on the Psychiatric Service of Dr. Eugene Kahn.



At weekly Pediatric Neurology Postclinic Conference, Dr. Adams discusses difficult or particularly interesting medical problems with members of the pediatric neurology staff.

As a young physician, Dr. Adams served as Associate Pathologist and Neurologist for 10 years at the Boston City Hospital and in varying capacities at what is now Tufts-New England Medical Center in Boston before coming to the MGH as Chief of the Neurology Service and as Neuropathologist.

During those early years he launched extensive investigations into alcoholic, cerebrovascular, and muscle diseases.

He was responsible in large part for the discovery that alcoholics are at increased risk for more than a half dozen diseases involving various parts of the nervous system.

For about five years he was deeply involved in learning about nutritional diseases of the nervous system, especially the effects of thiamine, pantothenic acid, and pyridoxine deficiencies, and the effects on this system of liver disorders.

He later devoted much time to immunopathology, discovering with Dr. Byron H. Waksman the first animal model of experimental neuritis, and to exploring the cause of myelitis, encephalitis, and the effects of diphtheria toxin on peripheral nerves.

Scientific papers flowed from Dr. Adams on these and other topics. With his associates, he wrote the first papers on a variety of difficult medical problems (such as basilar artery occlusion, hereditary hydrocephalus due to aqueductal stenosis, pontine myelinolysis, alcoholic cerebellar degeneration, oculopharyngeal muscular dystrophy, normal pressure hydrocephalus, and episodic global amnesia).

"I'd work in one area of research for a few years and then move on," Dr. Adams said, "because the methodology needed to go forward either was unavailable or beyond my skill."

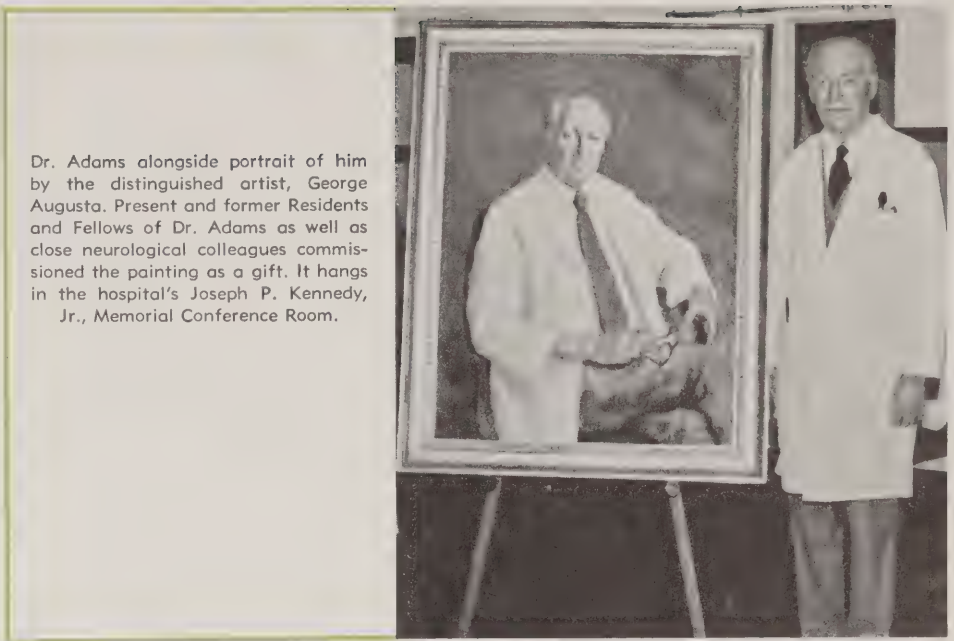
Today, his publications number more than 240 and include 10 books.

His tenure at the MGH began with development of a rigorous training program to prepare young physicians not only to be clinical neurologists but neurological scientists as well.

As time went by, laboratories of neurophysiology, biophysics, behavioral psychology, immunology, neurochemistry, electron microscopy, and experimental neuropathology took form. One of the first Departments of Pediatric Neurology in the United States was also established.

"There's a tremendous need for people who understand the many dis-

Dr. Adams alongside portrait of him by the distinguished artist, George Augusta. Present and former Residents and Fellows of Dr. Adams as well as close neurological colleagues commissioned the painting as a gift. It hangs in the hospital's Joseph P. Kennedy, Jr., Memorial Conference Room.



eases of the nervous system," Dr. Adams said, "and to just turn out physicians for the practice of neurology is a slow way of making progress. Probably 90 percent of our residents go on to university hospitals and academic appointments.

"More than 25 major departments of neurology in the United States and Western Europe are headed by men and women who had their training in neurology at the MGH."

In addition to supervising training activities at the MGH, Dr. Adams has sought to bolster undeveloped departments of neurology in several universities overseas, including the University of Lausanne in Switzerland and American University in Lebanon.

During the 1950s, he and his colleagues trained virtually all of the young neurologists in Colombia.

Special interest in mental retardation developed at the MGH at this time. Very little was being done in this field in the United States, and even less in Europe. Studies of mental retardation in the Joseph P. Kennedy, Jr., Memorial Laboratories at the MGH and at the Shriver Center followed as a natural extension of the work.

"It seemed to me," Dr. Adams said, "that the largest mass of the unexplored diseases of the human brain were hidden away in institutions for the mentally retarded without anyone making any effort to examine the patients, to diagnose the diseases, and to find ways of treating these patients and others, and preventing the disorders."

The Shriver Center in Waltham

headed by Dr. Adams was the first of 12 institutes officially designated for the scientific study of mental retardation and the only one in the United States located on the grounds of a school for the mentally retarded.

Of many investigations under way at Shriver, the principal one involves exploring the biochemical bases of the brain's inherited metabolic diseases which cause retardation. An entire floor is dedicated to this.

Dr. Adams continues to supervise other research activities at the Kennedy Laboratories which are integrated with the Shriver Center.

Many honors have been paid to Dr. Adams, including the presidency of the American Association of Neuropathologists (1950) and the American Neurological Association (1968).

He is a Fellow of the American College of Physicians, the American Academy of Arts and Sciences, the Royal Societies of Medicine in Sweden and England, and virtually all the Neurological Societies of Western European and South American countries.

He holds honorary degrees from Harvard, the University of Ghent, Belgium; the University of Newcastle-upon-Tyne, England; and the University of Lausanne. He was knighted by the Lebanese government.

With his many responsibilities, Dr. Adams still manages to play golf twice a week and tennis three times weekly.

Where does he get the time? Dr. Adams had a ready answer:

"I have everything organized."

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Faulty Protein Weakens Body's Defenses

White blood cells float through the blood stream but, contrary to general belief, when they enter the body's tissues to kill invading bacteria, the cells no longer float. They crawl.

And to crawl they must have some form of locomotive power.

Until 10 years ago the nature of this force puzzled medical investigators. Then evidence began to accumulate implicating certain so-called contractile proteins such as actin and myosin.

These substances are responsible for the contraction and relaxation of muscle.

"We have a very good understanding of how muscle works," said Dr. Thomas P. Stossel, MGH Chief of Medical Oncology (tumor medicine), "but a very poor idea of the role of these proteins in nonmuscle cells. Yet actin constitutes as much as 10 percent of the total protein in these other cells."

Dr. Stossel is conducting research on the function of actin in blood following

documented evidence of what can result when the protein acts abnormally.

A baby appeared healthy at birth in a hospital in northern New England, but three days later his right, lower eyelid became inflamed.

Physicians diagnosed a bacterial infection (*Staphylococcus aureus*) and treated it successfully with an antibiotic.

Unknown to them, the fight was just beginning.

During the next five months, the infection recurred repeatedly, accompanied by fever reaching 40°C (104°F). The organism was cultured from lesions appearing on the baby's back, abdomen, and thigh.

Concluding that the infant was suffering from a disorder of white blood cells, the attending physicians requested the assistance of Dr. Stossel, a specialist in that field.

They sent the child to Children's Hospital Medical Center in Boston where Dr. Stossel then was a staff

member.

The baby continued, however, to contract bacterial infections. Although Dr. Stossel and his colleagues ascertained actin dysfunction, they were unable to overcome the problem. At 10 months of age, the infant died.

Research has disclosed that within free-moving cells such as white blood cells tiny filaments of actin are formed and seem to act as microscopic muscles that enable the cells to "crawl" about. In Dr. Stossel's patient, the actin failed to produce these filaments. As a result the white cells were unable to attack and absorb bacteria.

Dr. Stossel subsequently learned that both parents of the baby have a partial deficiency of actin function. While the condition does not appear to harm them, it can be passed on to any future children.

The National Foundation-March of Dimes recently awarded the MGH a birth defects research grant of \$29,000 for the first year of a two-year study of this family by Dr. Stossel and his medical oncology laboratory.

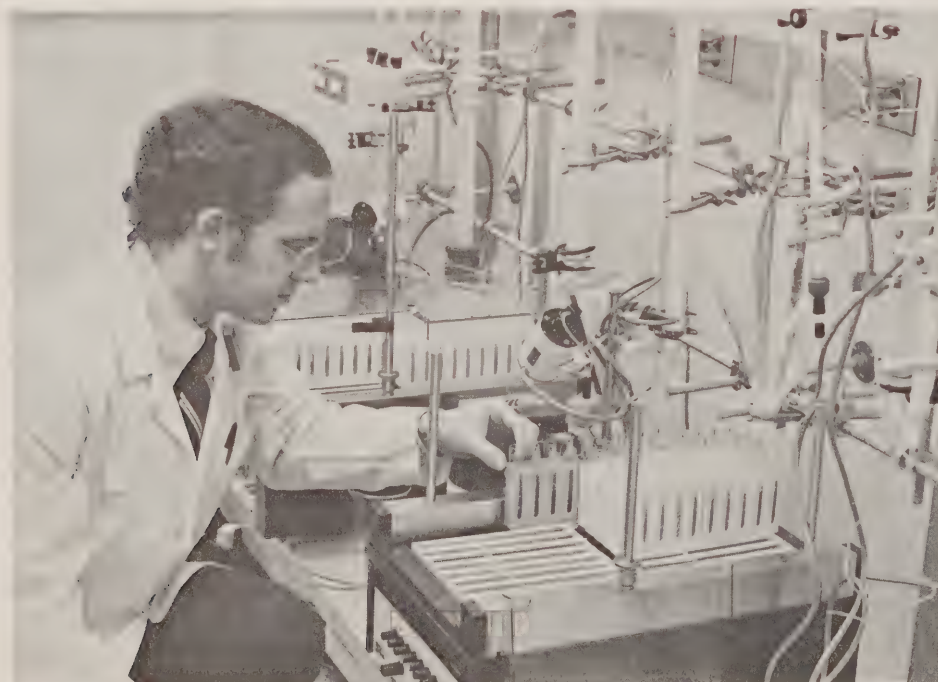
This work has also been supported by a grant from the Edwin S. Webster Foundation.

The parents are undergoing periodic observation of their condition and providing necessary blood samples for testing.

Actin is found not only in muscle and blood cells, but also in nerve, skin, tumor, and other cells, and it interacts with many other proteins.

Dr. Stossel, an Associate Professor of Medicine at Harvard Medical School, said, "It seems inconceivable that abnormalities of this protein, either in structure or function, are not the underlying cause of some types of unexplained cell behavior in human disease.

"We hope that by gaining a better understanding of how actin works and by cataloguing, defining, and describing situations in which it doesn't work, we will be able to evolve a strategy, perhaps a drug, to help control the problem."



A procedure known as column chromatography enables Dr. Philip Amrein, Clinical and Research Fellow in Hematology-Oncology, to separate various proteins, including actin, from white blood cells.



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After a Heart Attack, the Mind Needs Healing Too

Influenza: A Disease Still Feared Worldwide

Since the time of Hippocrates, the "Father of Medicine," changes in weather have been cited as a major cause of colds.

Statistics verify that in the fall when warm days often give way to chilly nights, the common cold traditionally becomes more common.

Although poorly understood in its relationship to other diseases, a cold generally creates little concern. It can make you miserable, but you are sure that in a few days you will feel better.

The simplistic attitude that most people exhibit toward a cold carries in itself an element of risk; a cold can easily mask the only disease still capable of causing worldwide epidemics in modern times: influenza.

During the last decade in the United States alone, epidemics of influenza A raised the normally expected death toll from the disease by more than 150,000.

The cold and flu seasons virtually coincide. October ranks as the worst month of the year for colds, and health officials receive initial reports of the flu only a few weeks later, around Thanksgiving.

Flu germs, as those of colds, spread from person to person by direct contact through breathing, coughing, sneezing, and speaking.

Symptoms of both diseases include fatigue, headaches, a runny nose, and chills.

Fever and muscle aches are additional hallmarks of the flu, also known as gripe. While fever would be unusual in an adult combatting a cold, an

increased temperature commonly appears in children with this distress.

The signs of colds and influenza are so similar that proper diagnosis of the flu requires a laboratory analysis of the offending organism.

Despite their similarity of symptoms, however, the two diseases differ markedly. Colds emanate from a "mixed bag" of short-lived viruses. Flu viruses, on the other hand, belong to a specific family of organisms. They tend to infect not only the nose but the lower respiratory tract as well.

For reasons that remain unclear, flu
(Continued on Page 4)



Dr. Ned H. Cassem, MGH psychiatrist, eases the concern of a Coronary Care Unit patient by demonstrating with a sketch how a damaged heart can repair itself.

Home three weeks after hospital treatment for a heart attack, Jeff felt a compulsion to get out of the house.

"I'm going for a walk," he announced to his wife. Admonished not to over-exert himself, Jeff stepped outdoors and edged along the sidewalk.

After he had walked a couple of hundred yards, the general sensation of well-being that had incited the urge to stroll suddenly gave way to anxiety.

Jeff felt a bit of discomfort in his chest. Six months earlier he would not have given it a second thought. But now he wondered fearfully, "Am I going to have another attack?"

He walked on, his uneasiness increasing as the malaise persisted. "Will I have to go back to the hospital? Will I make it in time?" Unending questions that crossed his mind intensified his apprehension.

An hour later, after nothing had happened, Jeff became furious with himself for being such a hypochondriac.

"This experience is common among people recovering from heart attacks," said Dr. Ned H. Cassem, an MGH psychiatrist who has given professional assistance to hundreds of coronary patients.

"The heart takes six weeks to heal, but the mind takes longer.

"Virtually all heart patients become hypochondriacs for a time after they leave the hospital. This is just a normal phase of the adjustment process."

Studies show that among people of middle age who have overcome myocardial infarctions (heart attacks) 50 percent return to work within three

(Continued on Page 2)



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EDITORIALS:

Illness As Metaphor

Nearly everyone knows the pattern of treating a heart attack. Patient suffers chest pains, goes to a hospital, is probably admitted to a coronary care unit, hopefully recovers and goes home, recuperates, and returns to work. A front-page article in this issue deals with the hidden side of coronaries: the psychological.

Coming to grips with the fear and depression that a heart attack often engenders is a special interest of MGH psychiatrists. Their work serves as another reminder that the physical side of disease has a psychological counterpart to which the physician must also attend.

In her book, *Illness As Metaphor*, Susan Sontag describes the mystique of the word "cancer." Heart disease and cancer are among the most common serious afflictions in the United States. Regarded as killers, both diseases provoke fear that often transcends reality.

Yet there are many other illnesses whose very names are buzz words that generate anxiety out of proportion to the facts. To combat these unrealistic reactions requires a great deal of effort. Health professionals routinely have to take time from their busy schedules to educate their patients about their illnesses. What would help is if journalists would place more emphasis on educational features that put diseases in proper perspective. If schools would emphasize not only preventive health but also the explanation of disease states. And if parents would teach their children more about health and disease. If parents do not have enough knowledge themselves, they could at least encourage their children to use the public libraries.

Education is not a sure-fire technique to eliminate fear. Indeed sometimes fear is justified. But knowledge goes a long way to banish the common form of anxiety that is rooted in ignorance.

An MGH Bicentennial

Two centuries ago this year John Collins Warren was born in a house that stood on the spot now occupied by the parent store of Jordan Marsh. Warren journeyed far from Boston both geographically—to Europe for his education—and figuratively in his career to the pinnacle of American surgery. The hospital he cofounded had a capacity of 73 beds soon after it opened its first building in 1821. Today the main campus of the MGH embraces 7,500 employees working in 19 buildings, and the total annual budget is nearly \$200 million. But it is the quality of medicine practiced at the hospital today that would amaze Warren. The ability to diagnose and treat has advanced light years since his time and has an even brighter future.

Heart Patients Often Judge Their Illness By Rate of Fatigue

(Continued from Page 1)

months and another 35 percent within six months.

The remainder often require psychiatric intervention. Although physically ready to resume work, they find themselves either unable to surmount their depression or anxiety or realize that psychosocial problems dating to earlier times are impeding their recovery.

"I'm convinced," Dr. Cassem remarked, "that if you could persuade this group to undertake a program of graduated exercise, at least half would eventually return to gainful employment."

Many heart patients mistakenly associate fatigue with the severity of their heart illness. By lying immobilized in bed, a patient loses up to 15 percent of his total muscle strength each week.

Physicians emphasize that only activity can strengthen atrophied muscles. As the participants become stronger, their despondency tends to abate.

Before prescribing an exercise course of treatment, the doctor must judge how much energy his patient can expend safely. A treadmill or step-climbing "stress test" can help in assessing the patient's limitations.

The exercise program would offer several options. Activities of a very competitive nature and those which tend to work up emotions are avoided.

"The idea is to accentuate the positive," said Dr. Cassem, an Associate Professor of Psychiatry at Harvard Medical School. "Proper exercise and diet, regular habits, and increasing one's capacity to relax are all positive things that the patient should be concentrating on, instead of a list of 'don'ts' or imminent death."

To assess the frequency of psychological difficulties in acute coronary patients, Dr. Thomas P. Hackett, Chief of the MGH Psychiatric Service, and Dr. Cassem surveyed a 15-month period in the hospital's Coronary Care Unit.

Photographs: Pages 1, 3, 4, 6, Myron Daniels; p. 5, courtesy of Dr. Martin S. Hirsch; p. 7, MGH Archives; p. 8, MGH Photo Lab.

Of 441 patients admitted during that time, 145 (32.7 percent) were referred for psychiatric consultation. The most frequent reasons were anxiety, depression, and behavioral problems. Ages of the patients referred ranged from 22 to 82 years with a mean of 57.2. Men outnumbered women 4 to 1.

From the study Drs. Hackett and Cassem tried to summarize the complex set of emotional reactions that a normal individual might have to a myocardial infarction.

"If a person develops severe chest pains, begins to sweat profusely, is rushed to a hospital intensive care unit, and is informed that he probably suffered a heart attack, he would be abnormal if he weren't scared," Dr. Cassem said.

On the second day of hospitalization as the patient begins to feel a little improved and less frightened, he may find it hard to believe that he really had a heart attack. If the diagnosis were not yet confirmed, he might protest his detention in the unit and insist on returning to his home and the responsibilities of his job.

By the third or fourth day, however, as he becomes more cognizant of his true condition, despondency often sets in. The more devastating the effects of the heart attack, the more profound the depression is likely to be.

"One might say that a myocardial infarction produces an ego infarction," Dr. Hackett remarked in a Symposium on Psychiatry in Internal Medicine.

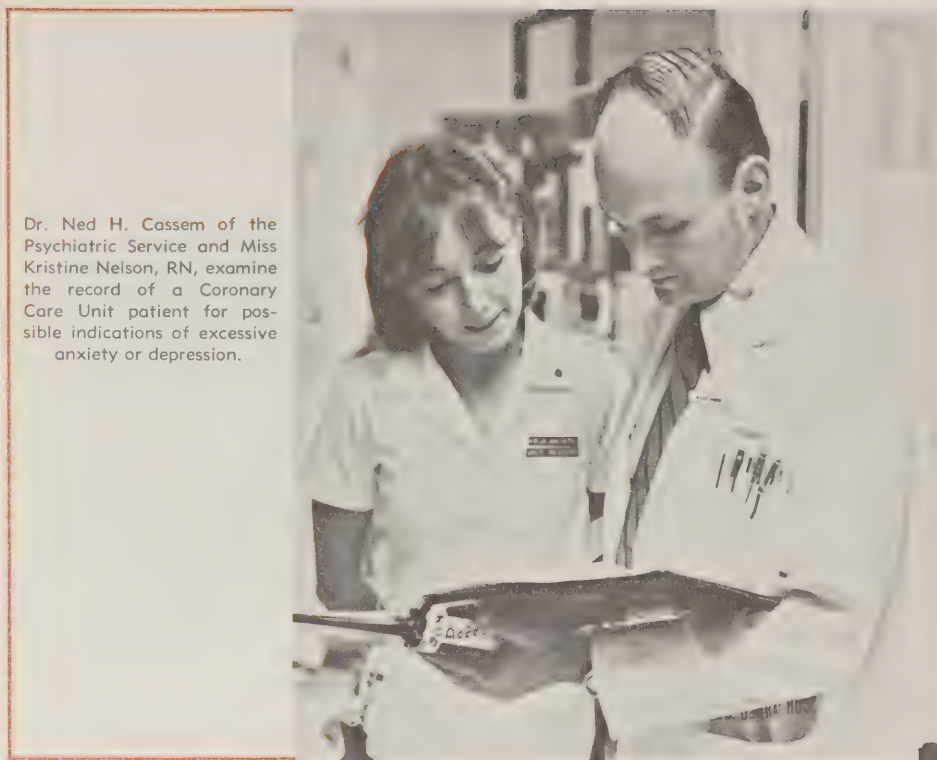
"Even while in the coronary care unit, a patient begins to ruminate about all that his heart attack had done to him: his job is in danger, earning power is lost, he is getting old, falling apart; he will not be able to drive, exercise, satisfy his wife sexually; smoking, overeating, drinking alcoholic beverages—all may be forbidden.

"Even if he survives the heart attack, most of life's pleasures, he thinks, have been forfeited."

In the extreme it is as if a patient, being prepared for surgery, learns he has a five percent chance of dying on the operating table. Instead of concentrating on the overwhelming odds favoring recovery, he dwells on that fatal five percent and convinces himself, "I'm a gonner."

In an earlier journal article, Drs. Hackett and Cassem wrote about a 61-year-old professor of political science who was stricken with a heart attack

Dr. Ned H. Cassem of the Psychiatric Service and Miss Kristine Nelson, RN, examine the record of a Coronary Care Unit patient for possible indications of excessive anxiety or depression.



after being in robust health all his life.

"He was so dismayed by his sense of weakness," they reported, "that he refused to have blood drawn or to take any medication, under the delusion that the staff was conspiring to make him worse.

"In such a case, sedation, usually indispensable for coronary care unit patients, can actually increase anxiety by adding to the patient's sense of losing his grip on life or sanity. For seven such patients, drug therapy had to be reduced or discontinued."

Frequently, a physician caring for a heart patient will carry a pad showing sketches of the heart, including its chambers, valves, and blood vessels.

Using these sketches, he can explain pictorially just how extensive the heart damage was and how the heart repairs itself.

It has been estimated that at the time of discharge one third of myocardial infarction (M.I.) patients in this country have absolutely no understanding of the physical basis of their affliction.

Each year in the United States, one million people suffer heart attacks of varying types and 350,000 die before reaching a hospital.

The American Heart Association reports that the average victim waits about four hours before seeking medical attention.

"The reason for this delay is simple," said Dr. Hackett, who with Dr. Cassem

conducted studies which helped to determine the length of this waiting period. "People either can't make up their mind about what to do or they deny the seriousness of their plight.

"Delay can make the difference between life and death. Once you have reached the hospital, your chance of survival is much greater."

The Heart Association describes the coronary care unit as one of the most significant advances in recent years. In many cases, according to the association, such units, since the early 1960s, have reduced in-hospital heart attack death rates by 30 percent.

Before coronary patients are discharged from a hospital, Dr. Hackett, Professor of Psychiatry at Harvard Medical School, urges that physicians meet with the patients and a member of their family to answer questions that may arise, and to suggest questions if none are forthcoming.

In these educational seminars the widely held myths relating to coronary heart disease, such as you are "over the hill" after an M.I., can be dispelled.

Similarly, he said, patients should be advised that feelings of depression and fatigue may continue for two or three months after an attack, and that is normal.

"Predicting such a response," Dr. Hackett said, "is often enough to undercut it or, short of that, to make it less worrisome."



The influenza vaccine for the coming season provides protection against three strains of virus which affected Americans earlier this year.

Alterations in Influenza Makeup Pose Threat

(Continued from Page 1)

viruses also tend to undergo changes known as "antigenic drifts" in their outer coat.

An antigen is a substance, often on the surface of a bacterium or virus, which stimulates body-defending agents called antibodies. Influenza vaccine causes the human system to develop antibodies which will recognize specific influenza antigens and kill the virus they are on.

If, however, the antigen undergoes a change, or drift, the immunity afforded by the original vaccine will be reduced.

With major changes in the influenza virus's antigenic makeup, this vaccine becomes ineffective, and a new protective agent is needed.

"Influenza B is a relatively stable virus, with antigenic changes resulting in epidemic disease only about every seven or ten years," said Dr. Adolf W. Karchmer of the MGH Infectious Disease Unit, "but influenza A shifts to some degree almost constantly.

"The basic approach to the prevention of influenza has been to try to figure out what strains most likely would be prevalent during the next flu season and provide a vaccine that would cope with that particular variety."

Viruses present during the previous season coupled with types reported during the year in other parts of the world offer guidelines to the kind of vaccine needed.

A slight alteration on the surface coat of a flu virus could spell minor outbreaks of the disease while significant changes might lead to major, even global, epidemics.

In 1918 and 1919 when microbiology was in its infancy and vaccines had not yet been developed, an influenza epidemic circled the world affecting, by conservative estimate, one fifth of the human race.

The death toll from complications of the flu climbed into the tens of millions and included as many as 850,000 lives lost in the United States.

The disease broke out in the early

spring of 1918 in Europe and was named the "Spanish flu" because Spain's neutrality in World War I permitted full medical reports to be received from that country.

First cases of the flu in the United States were recorded by late August in Boston, a major crossroads for military and civilian personnel involved in the allied war effort.

Within a few days after striking Boston, the virus had swept up and down the entire East Coast. By the end of October the onslaught had peaked across the nation.

In the early spring of 1957, the so-called Asian flu epidemic erupted in China. More than 250,000 residents of Hong Kong were treated for the malady within one week. Within two months, the virus had spread thousands of miles in all directions. In the United States, despite a rush to produce vaccine, the cost was 70,000 lives.

Eleven years later, Hong Kong became the scene of another epidemic. Striking in July, the virus moved eastward reaching California by October and affecting the entire country by Christmas.

The antigenic shift in the virus, however, apparently did not elude all of the immunity gained from exposure to earlier strains. The mortality rate among Americans was about half the 1957 toll.

The most recent alarm occurred two years ago when several hundred soldiers at Fort Dix, N.J., became ill from an influenza A virus similar to a kind that infects pigs.

Fears that swine flu may also have triggered the "Great Pandemic" of 1918 led the Federal Government to mount a massive inoculation drive costing \$135 million. More than 40 million Americans received shots.

Two developments brought the program to an abrupt halt. The Fort Dix outbreak turned out to be an isolated incident, and a small number of people who received swine flu vaccine later developed a neurological disorder called Guillain-Barre syndrome.

Guillain-Barre is fatal in about five percent of cases and causes some degree of permanent paralysis in another five percent. Federal health officials estimated that the risk of a flu vaccine recipient developing the neurological disease was about 1 in 100,000.

"Although the influenza vaccine has been epidemiologically implicated, we don't really know very much about the

Beating the Flu Bug

The United States Public Health Service strongly recommends flu shots for all individuals who would be at increased peril from infections of the lower respiratory tract and for persons over 65.

No medicine to cure the flu is known, but if the illness strikes, the patient should take these steps:

- Call the doctor.
- Go to bed and keep warm.
- Drink plenty of liquids but eat lightly.
- Take aspirin or some other analgesic to reduce head and muscle aches.
- Keep dishes and towels separate from others used by the family.

If no complications develop, the patient with a typical flu virus should recover in about five days.

Looking at the Root of the Problem

The middle-aged man arrived at the hospital nearly doubled up from abdominal pain.

Specialists in the Gastrointestinal (G.I.) Unit determined that stones had lodged in the common duct through which bile juices flow into the small bowel to aid digestion.

A year ago, the patient would have faced certain surgery, 10 to 14 days of hospital convalescence, and weeks of discomfort before returning to normal.

Employing a new procedure, however, the specialists took care of the patient's problem and sent him home the next day. He was feeling much improved.

Not only did he escape the conventional operation and the slow return to good health but also the added cost that the extra time in the hospital would have required.

Using an endoscope, a special lighted instrument which was extended through the mouth into the abdomen, the doctors were able to see and electrosurgically free the stones and restore proper drainage in the duct.

The procedure, called an endoscopic papillotomy, became available to G.I. specialists in many areas of the United States within the past year following encouraging results from its use with more than 1,500 patients in Europe. Most had previously undergone removal of their gall bladder.

"Initially, the papillotomy was reserved for patients who were poor surgical risks," said Dr. Robert H. Schapiro, Director of the Endoscopic Service in the G.I. Unit at the MGH.

"However, the successful outcome and low rate of complications led to extension of this technique in Europe to

patients without specific reasons for not having surgery.

"Even large common duct stones may pass spontaneously into the duodenum [the first part of the small intestine] either immediately following papillotomy or a few days after. When stones fail to pass spontaneously, they can be extracted using a device lowered through the endoscope. This has proved necessary in a minority of patients."

Sometimes, rather than stones, small areas of scarring create obstructions in the bile duct. The papillotomy technique may also prove helpful in treating this disorder.

Dr. Stephen E. Hedberg, Senior Endoscopist in Gastrointestinal Surgery, believes that endoscopic extraction of stones and relief of strictures will rapidly gain approval for all categories of patients here just as it has in Europe.

"At the present time, however, I am

(Continued on Page 6)

mechanism by which flu vaccine causes the syndrome [group of symptoms]," said Dr. Karchmer. "Guillain-Barre has been seen to follow a number of other viral illnesses. When influenza vaccine is given in accordance with official recommendations, I think the advantages of the vaccine far outweigh the small risk involved."

Observations during flu epidemics have indicated that flu-related deaths occur primarily among chronically ill adults and children and in older persons, especially those over 65 years of age.

Dr. Karchmer explained that the virus can damage the lining of the respiratory tract and alter cough reflexes, allowing bacteria to invade and cause pneumonia in one form or another.

The most common type by far is pneumococcal pneumonia. Last November the government licensed a vaccine which provides highly effective protection against the most dangerous kinds of pneumococcus.

More than 35,000 doses of the pneumonia vaccine have been administered by the Massachusetts Public Health Department, and ample supplies are available to the private health sectors.

The flu vaccine for the 1978-79 season will help to guard against three strains of viruses: A/Russian, A/Texas, and B/Hong Kong.

All were prevalent in the United States earlier this year. A/Russian caused outbreaks in a number of schools and colleges between January and April. A/Texas was associated with the strain that erupted in Hong Kong in 1968, and B/Hong Kong resembled a virus detected in the British crown colony in 1972.

Even as immunization programs move forward, so do efforts to improve the quality of protection.

Dr. Karchmer, an Assistant Professor of Medicine at Harvard Medical School, said one problem with flu vaccine is that it causes a modest amount of temporary

reactions, such as fever or a sore arm.

"This has limited the amount of killed viruses which can be used in a vaccine," he said. "Investigators are working with more purified preparations in hopes of overcoming the slight side effects, thereby permitting more viral antigen to be included in the vaccine."

A live flu vaccine may also lie in the future. With the present material offering only 60 to 70 percent protection against the disease, work to produce a live formula is being pushed. Live vaccines for polio, measles, and some other viruses are more than 90 percent effective.

Researchers are also evaluating antiviral compounds, such as amantadine hydrochloride, for use, with or without vaccines, in helping to protect elderly citizens against the flu.

This drug blocks the ability of influenza A viruses to penetrate and infect cells. A principal fault with the drug lies in its short-term protection. Anyone relying on amantadine hydrochloride alone would have to take it repeatedly during the entire flu season. Also, the medication has no effect on the B virus.

At present, the vagaries of influenza make it impossible to predict when, where, and whom the virus will strike. By taking proper safeguards, however, the severity of the disease, often called "the last Great Plague," can be reduced.



A variety of influenza viruses as seen through an electron microscope. Identifying each strain requires laboratory tests.

Doctors Find Growing Uses for Endoscopes

(Continued from Page 5)

naturally most impressed by the spectacular results achieved in the older, poor risk patients," he said. "On the surgical service we have recently extracted stones from two patients in their late 80s, one a diabetic and the other a severe cardiac, both without complications or the slightest discomfort to the patient.

"I view endoscopy as merely an extension of the diagnostic and therapeutic surgical armamentarium. With endoscopy and all its newer applications, we G.I. surgeons are just beginning to catch up to where urologists were with their cystoscopes fifty years ago."

Endoscopy has come a long way since 1806 when a German physician, Dr. Phillip Bozzini, demonstrated his "lichtleiter," or light conductor, to a medical assembly in Vienna.

The instrument illuminated deep cavities of the body by reflecting candle-light off a mirror. Although impressed by the principle, the gathering nevertheless dismissed Dr. Bozzini's invention as a toy.

Today endoscopic procedures are commonplace in medical centers throughout the world. Through a scope doctors can view internal disorders of many kinds and extract specimens to assist in diagnosis. Surgeons use the instrument to map detailed plans for delicate operations.

As for treatments devised in conjunction with the endoscope, the list grows steadily.

MGH physicians frequently treat patients for bleeding in the upper G.I. tract. The endoscope has enabled researchers at various medical centers to investigate several new approaches to this problem.

Dr. Schapiro, an Associate Clinical Professor of Medicine at Harvard Medical School, said one experimental approach involves the introduction of laser energy through the endoscope to coagulate the source of the bleeding. Another method under study calls for application of an adhesive spray through the scope.

Although the concept of endoscopy dates to 1806, its value went unrecognized until the early 1930s when two German doctors invented the flexible gastroscope to examine the stomach. The device was first used in the United States at the MGH in 1933.

As time passed, endoscopes underwent many modifications. In 1948, an MGH surgeon and endoscopist, the late Dr. Edward B. Benedict (*MGH News*, June-August 1974), introduced an operating gastroscope. With this tool, specialists for the first time were able to easily remove samples of tissue and other substances from the stomach.

Endoscopes varied greatly in size, form, and optical design depending on

their specific purpose. For many years tiny electric bulbs provided the necessary illumination.

In the early 1960s, the development of fiberoptic lighting propelled endoscopy forward. With this new light source, doctors found they could not only conduct tests more accurately and speedily but the range of diagnostic examinations possible with endoscopes also increased.

Fiberoptics utilize very thin fibers, or strands, of glass, each with an external coating that provides an inward, mirrored effect. The fibers are combined in a bundle, like a rope, and extend along the inner wall of the endoscope. Light entering one end of the scope travels along the fibers by reflecting back and forth off the sides within the glass core.

Availability of a light cable that was not only flexible but also cool, powerful, and reliable (the early electric bulbs often burned out) revolutionized instruments for examining the airways, esophagus, stomach, duodenum, rectum, colon, abdominal cavity, and joints.

The use of endoscopes for treatment as well as diagnostic work began in 1971. The colonoscopy for the early detection and removal of cancerous polyps from the colon through the rectum was one of the first and most dramatic of the new purposes.

Cancer of the colon, a part of the large intestine, ranks as the most common abdominal malignancy. Polyps, cell growths in the lining of the colon, cause most of the problems.

The colon patient who undergoes conventional surgery would spend up to two weeks in the hospital and feel below par for several weeks afterward. Having had a colonoscopy, however, he would feel reasonably well within one day and be able to resume normal activities.

Although the colonoscopy is not totally without risk, the incidence of complications from this procedure has proved to be far smaller than from a conventional operation.

Dr. Hedberg directs the training of surgical residents in various endoscopic techniques. Two such residents work in endoscopy at all times as part of their general surgical rotation at the MGH. A number have gone on to use endoscopy in their practices after completion of their training. Dr. Schapiro is in charge of teaching the methods to medical Fellows in the G.I. Unit.

Together, teams under Drs. Hedberg and Schapiro conduct between 160 and



A gastroscope enables Dr. John W. Popp, Jr., to check the stomach of a patient for a suspected ulcer.

MGH Commemorates 200th Anniversary Of Cofounder's Birth

When John Collins Warren graduated from Harvard College in 1797, his father, Dr. John Warren, an eminent surgeon and cofounder of Harvard Medical School, hoped to see him become a successful businessman.

A physician's life, Dr. Warren felt, was often difficult and unrewarding and certainly could not be recommended to his son who had exhibited absolutely no interest in studying medicine.

John Collins spent many months searching for an attractive mercantile position but, frustrated by one disappointment after another, he eventually wound up in his father's office, working reluctantly as a medical apprentice.

The path upon which John Collins trod with much reservation was to lead in later years to his being acclaimed as the foremost American surgeon of his day and as cofounder with Dr. James Jackson of the Massachusetts General Hospital.

It was at the MGH on the morning of October 16, 1846, that the most dramatic event in Dr. Warren's illustrious career occurred.

Skilled of hand and steady of nerve, he removed a tumor from the neck of one Gilbert Abbott while the patient was in a deep sleep induced by the inhalation of sulphuric ether administered by a dentist, Dr. William T. G. Morton.

The operation introduced to the world a method of ending the agony of surgery. Dr. Oliver Wendell Holmes, an MGH physician, coined the term anesthesia to describe the procedure. He spoke of the discovery as "this priceless gift to humanity."



Some time after their MGH demonstration in 1846 which proved the value of anesthesia in surgery, Drs. John Collins Warren (second from right) and William T. G. Morton (fourth from right) were photographed preparing to reenact the historic event.

This month marks the 132nd anniversary of the historic operation which took place in an amphitheater under the dome of the MGH's Bulfinch Building.

Traditional Ether Day ceremonies to commemorate the occasion will take on added significance this year since 1978 is also the 200th anniversary of the birth of Dr. John Collins Warren.

The young man who initially had no desire to pursue a medical career was not persuaded otherwise by his father's tutelage. A trip to England to think about his future served as the catalyst that swung him around.

Not yet 21, he arrived in London at a time when surgery was coming into its own as a formal branch of scientific medicine. Previously, surgeons had often been regarded with suspicion, distrust, and fear.

Hired at Guy's Hospital as a "dresser," a surgical assistant to dress

wounds, John Collins had the rare opportunity to watch some of England's great surgeons at work, and he became fascinated.

He plunged into the study of medicine, devoting all of his energy and time to becoming a doctor. After a year in London, he went to the Royal Infirmary in Edinburgh, Scotland, then the mecca of medical students the world over. He studied there a year before rounding out his medical training under the principal physicians and surgeons of Paris.

Returning to Boston in 1802, Dr. Warren joined his father in the practice of surgery.

The relationship between John Collins Warren and James Jackson began during student days, but while Warren specialized in surgery, Jackson's interest was aroused by the new discovery of vaccination, and he concentrated on becoming a physician.

(Concluded on Page 8)

200 gastrointestinal endoscopies each month.

Dr. Hedberg has kept an account of the colonoscopic polypectomies (polyps removals) performed at the MGH during the past seven years. Information is stored in the MGH computer for analysis of more than 3,000 such procedures.

Although some doctors prefer to do the various endoscopic procedures while the patient is under a general anesthetic, the policy in the G.I. Unit is to keep the patient awake.

"Since the very sophisticated and

flexible equipment now available minimizes discomfort for the patient, anesthesia becomes an unnecessary risk," said Dr. John W. Popp, Jr., an MGH Clinical and Research Fellow in Gastroenterology.

He said that by remaining awake the patient also can assist the doctor with changes in body position.

Some patients fear that insertion of a tube through their mouth will cause them to gag. Spraying the throat with a numbing medication overcomes this fear.

"The numbing effect lasts for a couple of hours," Dr. Popp remarked. "We also administer certain other medication intravenously to help the patient relax."

In the early 1930s when endoscopy was in its infancy, an endoscopist at the MGH would visit the wards to inquire of staff personnel whether his service was needed. Often he received the frustrating reply, "We don't want to put the patients through it."

Today the staff seeks out the endoscopist.

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DR. WARREN:

"Every Man Becomes Our Neighbour"

(Concluded from Page 7)

The need for a hospital in Boston prompted the two men to join forces with a minister, the Rev. John Bartlett. In the very early 1800s, Boston's only institutions to treat the sick were a public dispensary and a poorhouse. People of means obtained medical care in their own homes.

On August 20, 1810, the two doctors, urged on by Mr. Bartlett, distributed a circular among the community's affluent, specifically "those who indulge in the true luxury of wealth, the pleasures of charity. . . .

"When in distress, every man becomes our neighbour," they stressed. At the same time, they cited the need of Harvard Medical School for a hospital to assist in the training of students.

They argued that a university medical department built on a course of theoretical lectures without laboratories and a clinic can have no permanent stability.

The circular succeeded in raising the funds needed for the granting of a

charter to the MGH in 1811. The cornerstone for the Bulfinch Building, the hospital's original structure, was laid on July 4, 1818, and the building opened on September 1, 1821. Drs. Warren and Jackson became the hospital's first surgeon and first physician, respectively.

Dr. Warren filled many important offices during more than a half century in the medical profession.

He held his MGH post for more than 30 years. From 1809 to 1847 he also served as a professor of anatomy and surgery at Harvard Medical School. He was Dean from 1816 to 1819.

The Massachusetts Medical Society and the American Medical Association both elected him president.

Despite his many duties, Dr. Warren still found time to write extensively and helped to establish the New England Journal of Medicine and Surgery.

In 1824, he wrote an article for the Boston Journal of Philosophy and the Arts describing his examination of an ancient Egyptian mummy which the

MGH had received as a gift the year before. The mummy resides in a glass case in the Ether Dome.

In 1837, Dr. Warren authored the first American treatise on tumors.

In 1841, he created a fund "for the purchase of religious and moral books" to be distributed to MGH patients. This led to the birth of the Warren Library, the first nonmedical library in any American hospital.

Today the library boasts a collection of more than 6,500 books available on loan not only to patients but also to anyone connected with the MGH.

The Warren Anatomical Museum at Harvard Medical School was created in 1847 with the gift of a large collection of specimens gathered by Dr. Warren during his long career.

Of countless tributes paid to him during his lifetime and after his death in 1856, one of the most notable was the establishment of the Warren Triennial Prize by a son, Dr. J. Mason Warren, who introduced the art of plastic surgery from Europe to America.

Starting in 1871, an award was presented every three years for the best dissertation on a subject in physiology, surgery, or pathological anatomy. In 1952, lectures replaced the dissertations.

Of 13 scientists who have delivered the Warren Lectures, seven have gone on to become Nobel Prize winners.

The memory of Dr. John Collins Warren, his father, his son, and three other Warren descendants, all of whom distinguished themselves as doctors, was perpetuated in 1956 with the dedication at the MGH of the 12-story Warren Building. It was designed to house the Pathology Department and clinical and research laboratories for neurology, neurosurgery, psychiatry, and dermatology.

In the lobby, a wall inscription reads: "A tribute to the members of the Warren family for their contributions to the medicine and surgery of the New World."



A fund created by Dr. John Collins Warren 137 years ago led to the establishment of the MGH's Warren Library, the first nonmedical library in an American hospital.



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Studies Explore Best Roles for the Body Scanner

Helping the Living to Learn From the Dead

"We do not hesitate to have operations performed on our bodies when we are alive and circumstances require it. Why then should we mind operations, with the same care, the same gentleness, and the same reverence, being done on our bodies when we are dead? The benefit of such service to the living is very great."

A twice-elected president of the British Medical Association voiced these sentiments as he left specific directions for a thorough examination of his body upon his death.

"I do this," the late Lord Dawson explained, "because I think the public does not sufficiently realize the importance of postmortem examinations and the advantages to knowledge and therefore to future generations which will accrue."

Although spoken long ago, the words of the British peer return to mind as many medical authorities express concern today over a declining rate of postmortems, or autopsies, in major medical centers across the United States.

Shortly after World War II, the number of autopsies performed in American hospitals equaled nearly half of all hospital deaths. By 1964, the rate had slipped to 41 percent; by 1970, to 29 percent; by 1973, to 22.2 percent; and by 1975, to 21.7 percent.

The autopsy rate has since fallen to less than 20 percent at some centers.

At the MGH, the number of postmortems conducted in recent years has also declined from previous rates of about 65 percent, but during 1978 it

still averages 50 percent of all deaths at the hospital.

"In view of the technological advances that permit improved diagnosis, it is understandable why enthusiasm for autopsies has lessened nationally," said Dr. Robert T. McCluskey, Chief of Pathology at the MGH, "but I think a further decline would be a serious loss, indeed."

Many laymen associate autopsies with ascertaining causes of death arising from suspicious circumstances or acts of violence. However, this is not an important function of the autopsy at the MGH. Thus, of 62 postmortems done at the MGH in one recent period, only

(Continued on Page 4)



By performing autopsies, Andreas Vesalius revolutionized the study and teaching of anatomy in the 16th century.

Separate MGH studies spanning the past two years are helping to establish guidelines for the most effective role that computed body tomography (CBT) can play in detecting and mapping the location of human illness.

Improved diagnostic understanding, changes in treatment, and the elimination of planned operations or invasive tests resulted among patients who received CBT scans during an evaluation of this innovative technology.

The investigators are determining that the scans are more helpful in some ways and less in others than was previously thought. More efficient use of scanners is thus being made possible and could eventually save the American public many millions of dollars.

There are two types of the X-ray device, body and brain scanners.

In 1973, the MGH became only the second institution in North America to install a CT brain scanner which operates on the same principle as the body scanner. Successes with this device led in 1976 to the hospital's use of a body scanner, provided by EMI Limited. The British firm also helped to fund studies of the machine.

The body scanner directs a series of X-ray beams through a cross-sectional "slice" of the body where disease is suspected. Very sensitive detectors record any abnormalities and feed the data into a computer for analysis. The results appear as an image on a television screen, but for accurate diagnosis a skilled specialist must interpret them.

As long as these studies remain investigational, no charge is levied to the patient for an examination with the body scanner.

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EDITORIALS:

A Bit of Immortality

Death has always shrouded itself in a special aura. Even primitive societies have looked upon the end of earthly life as the ultimate enigma. And in ancient Egypt the ka or spirit that was believed to live after death was thought to reside in the body or in a sacred statue entombed with the deceased and consequently given food, personal belongings, and transportation for the afterlife.

No wonder, therefore, that man has been reluctant to consider any action which violates the body after death. Yet even in Egypt the ancients surgically removed the human viscera as part of the embalming process.

A page 1 article in this issue centers on the phenomenon of the dwindling number of autopsies carried out in this country. What separates them from other operations is the obvious fact that the surgery is performed on a lifeless body. No need to recount here the gains to mankind that result from autopsies. Suffice it to say that the advantages are considerable. In addition to the more obvious benefits to society, they include the psychological one to a survivor who will not have to go through life wondering about the cause of a loved one's death.

In the case of organ donations from nonliving donors, there is an additional benefit that accrues to survivors of the donor: the knowledge that a part of the deceased is alive and contributing to the well-being of another human.

For each person the decision of whether to allow an autopsy or the use of an organ is an individual choice. We hope that this issue of the *MGH News* is sufficiently informative to help individuals to make their own decision intelligently.

Better Guidelines for CT Scanning

CT scanning has been praised as the most revolutionary radiologic advance since Roentgen harnessed the X ray. On the other hand critics have condemned the procedure as potentially cost ineffective. In a sense both reactions are accurate. The scans have been revolutionary in improving the very way some branches of medicine are practiced. At the same time the devices are too costly to permit them to be bought or used thoughtlessly or inefficiently.

That is why the studies described in a page 1 article may become so important. One must be encouraged to see that much needed scientific endeavors are being carried out in an effort to better define the ways in which CT scans are most effective.

Body Scanner Exams Can Avert Invasive Diagnostic Testing

(Continued from Page 1)

Interim results of one study, reported to an International Symposium and Course on Computed Tomography at Miami Beach, Fla., showed that CBT led to altered treatment for 34 (or 52 percent) of 65 patients undergoing radiation therapy for various forms of cancer. The original therapy had been prescribed after conventional examinations.

Michael Goitein, Ph.D., an MGH Associate Radiation Biophysicist, told the Florida meeting that in 31 of the patients CBT demonstrated that the prescribed procedures were not adequately covering the volume of the tumor.

"Approximately half of all patients found to have malignancy are eventually treated by radiation therapy," Dr. Goitein said. "Our study makes it clear that a large number of such patients can benefit significantly from CBT scanning."

Associated with Dr. Goitein in the research were Drs. Jack Wittenberg, Joseph T. Ferrucci, Jr., Leonard L. Gunderson, Rita M. Linggood, and William U. Shipley; Carl E. Friedberg, Ph.D.; Joanne Doucette, and Marta Mendiondo, all of the MGH; and Dr. Harvey V. Fineberg of the Harvard School of Public Health.

In another study, reported in the July 1978 issue of the *American Journal of Roentgenology*, a different MGH team, and Dr. Fineberg, published these findings from use of the body scanner with 184 patients:

Diagnostic understanding improved in 41 percent of the group.

Confidence in a previously chosen plan of treatment was reinforced in 43 percent.

Treatment was modified in 17 percent. In 15 patients, scans showed the disease to be either absent or less severe than expected. In 16 patients, the disease appeared to be more severe than anticipated. And, because of the extent

Photographs: Page 3, Raymond Sprague; pp. 5, 6, 7, 8, Myron Daniels.



In preparation for a body scan, the patient lies on a table and is moved through the aperture of the scanner until the area of a suspected disorder is reached.

of illness, treatment in one patient was stopped, except for supportive measures.

Of the 32 individuals for whom treatment was altered, 21 were spared surgery. The CBT results thus eliminated both added risk and expense for these patients.

Additionally, the body scans led to cancellation of angiograms scheduled for 25 of 36 patients and a procedure called endoscopic retrograde cholangiopancreatography (ERCP) on 30 of 37 patients.

Angiograms are X rays of blood vessels made after injection of contrast material. ERCP is an endoscopic procedure permitting injection of contrast material into the pancreatic ducts so that X rays can search for any signs of disease in the pancreas.

Dr. Wittenberg, an MGH radiologist and principal author of the Journal report, said experience with the body scanner also projected a reduction in the need for lymphangiograms, a test for disorders in the body's lymph system.

"The scanner does not usually identify a specific disease," he said. "What it does is detect an anatomic abnormality, if one is present, and reports its exact location. The patient may then undergo an immediate biopsy so that the suspected tissue can be checked.

"We have sent nearly 75 such biopsy specimens to Dr. Priscilla Taft in the MGH Cytology Laboratory, and the results have proven useful in more than 90 percent of the samples."

Dr. Wittenberg, an Associate Professor of Radiology at Harvard Medical

School, told of a 52-year-old business executive who was admitted to the hospital because of bizarre behavior and abnormally low blood pressure. An ultrasound test disclosed a mass in the adrenal gland.

CT scanning provided precise anatomic information needed for performing a biopsy which revealed cells consistent with lymphoma, a type of cancer. Chemotherapy (drug treatment) restored the patient to good health. CT thus helped avert surgery.

In another instance, a 43-year-old physician was suspected of having a pancreatic tumor after he complained of abdominal pains, and ultrasound studies indicated a mass behind the peritoneum, the membrane surrounding the abdominal organs.

Fearful of having an incurable malignancy, the physician became very depressed and expressed concern about the welfare of his family. He then underwent a body scan, which showed his fears were unfounded.

The scan demonstrated that the mass effect was not caused by a tumor but by a variation in the shape of the patient's stomach. Further studies, such as angiography or exploratory surgery, were deemed unnecessary. The abdominal pain soon subsided, and the physician returned to his medical practice.

"There are times, of course, when an ultrasound clearly should be the examination of choice," Dr. Wittenberg said. "When we first began working with the body scanner, we felt the machine would be the ideal technique to discriminate between jaundiced pa-

tients who needed surgery and those who did not and who, in fact, might be harmed by an operation. It has since become obvious to us that ultrasound can provide more accurate information in this regard and do it more simply."

After conducting more than 1,300 body scans during the past two years, the radiologists who use the machine are confident they can judge when it will provide new information and when it will only duplicate data from other less costly examinations. If the latter seems evident, the CT scan is not done.

In emphasizing avoidance of duplication Drs. Wittenberg and Ferrucci pointed out that the study team included Dr. Fineberg from the Center for the Analysis of Health Practices at the Harvard School of Public Health.

"We realized when we started," he said, "that we had to incorporate a nonbiased person into our investigation. So we brought in someone from the other side of the fence, if you will, a health care evaluator. All of the work in the study was done in collaboration with Dr. Fineberg."

The study team also included Dr. Rob H. Kirkpatrick of the MGH; Dr. Edward B. Black, now of Memorial Hospital in Charlotte, N.C.; Dr. Derace L. Schaffer, now of the University of Rochester Medical School; and Margaret K. Ikeda, a former MGH Research Assistant.

In addition to funds from the manufacturer of the body scanner, the study was supported by grants from the Robert Wood Johnson Foundation and the Commonwealth Fund through Harvard's Center for the Analysis of Health Practices.

What does the future hold for the body scanner? Dr. Wittenberg pointed out that initially patients with disorders of the pancreas benefited most from the CT scans and those with lung trouble benefited least. But the situation has changed.

"We've discovered the scanner to be very useful in more diseases affecting the lungs, disorders such as a spreading of malignant tumors and an accumulation of fluid around the organs," he said. "So you might say that lungs are moving up the scale. We're learning new applications all the time.

"And we hope that as we move down the road we will be able to develop adjunct materials to tell us more about the tissue with which we're dealing. That would be a big step forward."

Autopsies Enhance Medical Knowledge

(Continued from Page 1)

6 were so-called medicolegal cases. The others were not obligatory but undertaken with the express permission of next of kin.

"Autopsies not only provide information concerning causes of death but they also continue to perform other vital functions," Dr. McCluskey pointed out.

"They serve as a check on the accuracy of diagnoses and the effectiveness or possible ill effects of treatment. They are a provider of organs and tissue that benefit the living. And they are absolutely essential to the training of pathologists."

Dissections of the human body date to the earliest days of civilization. However, during the Middle Ages, social and religious taboos halted such studies, but then they were resumed, first by artists such as Leonardo da Vinci and later by physicians such as Andreas Vesalius.

Not content merely to copy what he could see, Leonardo correlated anatomic parts to body function. He was the first to draw a fetus in the uterus with reasonable accuracy. He dissected the eyeball and illustrated it layer by layer.

A generation after Leonardo's death, Vesalius, then a 28-year-old lecturer at the University of Padua in Italy, gained fame with his *De Humani Corporis Fabrica Libri Septem*, a work on human

dissection which revolutionized the study and teaching of anatomy.

Vesalius held a civic position which enabled him to perform autopsies. In fashioning what was acclaimed as the first complete description of the human body, he was assisted by artist Jan Stephan van Calcar.

In the centuries that passed, autopsies played an integral part in the training of physicians and surgeons and added immeasurably to man's knowledge of human frailties and disease.

In modern times, the cause of diabetes became known, and a method for isolation of insulin was suggested through observations made at autopsies.

During the Korean War, military doctors conducted autopsies in Japan on a number of American war dead to assess the distribution of battle wounds and to devise body armor that could protect other GIs. This provided the doctors with the first opportunity to examine the coronary arteries of a sizable group of Americans who were in their early 20s. Did they have atherosclerosis, so-called hardening of the arteries?

The examination disclosed an unusual frequency of significant atherosclerotic plaques partially clogging the arteries of these young people. In contrast, autopsies on Korean soldiers showed a much lower incidence of coronary artery disease. The studies

provided evidence that American diets high in calories and animal fats might be damaging to the cardiovascular system.

An autopsy is still considered to be the best way of assessing the overall severity of atherosclerosis, and this is of major value in epidemiological studies to find causes.

The discovery that a serious form of chronic kidney disease results from excessive and prolonged use of pain reducing drugs containing a substance called phenacetin was made in large part at the autopsy table. Similarly, various drugs used in the treatment of cancer have been found to have adverse effects on lung tissue.

Autopsies provide a check on the effectiveness of operative procedures. If a patient dies after heart surgery, for instance, a postmortem can document the repairs that were made and show whether or not they constituted the best possible treatment. From such studies new techniques might evolve, improving the survival chances of future patients with the same affliction.

"People have given such humanitarian gifts as corneas, kidneys, skin, and bones for transplantation upon their death," said Dr. Alan L. Schiller, Chief of the MGH's Autopsy Pathology Service, as well as of the Bone Laboratory.

"Similarly, people have left body materials to laboratories, enabling them to move forward in vital research.

"Pituitary growth hormone to treat patients suffering from arrested growth development is obtainable only from autopsies. No one has yet found a way to synthesize this complex extract.

"The best surgeons in the hospital are frequently in the autopsy room, dissecting or learning new surgical approaches on bodies donated for such purposes."

Why then are autopsies declining in number?

"We don't know all of the reasons," said Dr. McCluskey, who is also Mallinckrodt Professor of Pathology at Harvard Medical School, "but obviously some doctors feel that information derived from postmortems can just as easily be obtained through radiologic, laboratory, or other procedures. That is often not the case.

"It is possible that some physicians or surgeons may fear what the autopsy will disclose, perhaps an error in diagnosis or treatment.

"And, of course, the doctor may



"The Anatomy Lesson of Dr. Nicolaes Tulp" by Rembrandt



The telephone call to the MGH Transplant Unit came in midafternoon: "This is the Midwest Organ Bank in Kansas City. We have a kidney whose blood and tissue closely match the requirements of one of your transplant candidates listed on our computer. Do you want to consider it?"

Dr. Charles F. Shield, a Surgical Fellow in the Unit, jotted down some statistics, contacted Thomas C. Fuller, Ph.D., Director of the MGH Histocompatibility Testing Laboratory, and then relayed their joint response, "Definitely!"

The organ bank reserved space aboard a Boston-bound jetliner for a special metal box containing a kidney

which had been removed 13 hours earlier from the body of a man who died in Wichita, Kan.

The box was equipped with an air tank to oxygenate the kidney, a circulating pump to maintain a cool temperature, and a "pulsatile" pump to control pressure in the organ while also perfusing it with plasma to keep it viable. Batteries provided the needed power.

A technician who accompanied the kidney to Boston's Logan Airport to ensure safe arrival also carried a box containing specimens of tissue (lymph node) taken from the organ donor.

Testing laboratories cross-match the tissue with that of the proposed kidney recipient to judge whether his body will probably accept the transplant. Thus, a snippet of the new kidney to establish compatibility is unnecessary.

Technicians from the Interhospital Organ Bank, Midwest's New England counterpart, took custody of the valu-

(Continued on Page 6)

simply feel that requesting autopsy permission from bereaved relatives will only upset them unnecessarily."

Even if the doctor seeks family consent, he may encounter a flat refusal due to lack of understanding or a fear that a loved one might be subjected to indignities.

"An autopsy is essentially an operation; it's just that the patient is dead," explained Dr. Schiller, an Assistant Professor of Pathology at Harvard Medical School. "A very strict and very orderly progression of events takes place.

"Every organ in the body is dissected, not only to determine the cause of the patient's death but hopefully to discover any intercurrent disease that the patient might have endured during his recent or remote past."

Dr. Schiller said a complete examination is performed in every case unless the family imposes restrictions, and this does not occur infrequently.

"The next of kin might say, 'You can examine only his liver,' and we will obey those wishes to the letter," he stated. "We have even been told that we could only conduct an examination through the original surgical incision."

All autopsies are carried out by residents in pathology under the close

supervision of a staff pathologist. Removal and dissection of organs, microscopic studies, and compiling a preliminary report may take five hours.

The cost? Nothing to the family. Because of the benefits to research and education, the hospital absorbs all expenses.

In the opinion of Drs. McCluskey and Schiller, reversal of the declining autopsy rate depends on educating both the medical profession and the public in the value of postmortems.

Dr. Schiller said medical students today receive little exposure to pathology. Consequently, they later find themselves unprepared to confront a family after a death and discuss having an autopsy performed. "They feel very uncomfortable and prefer not to do it," he stated.

In an article published recently in the *New England Journal of Medicine*, Dr. William C. Roberts of the Pathology Branch, National Heart, Lung, and Blood Institute, urged more specialized training within pathology.

"To provide more information to clinicians and surgeons from the autopsy, the pathologist must have greater expertise in certain subspecialties of medicine," he wrote.

"The most frequent cause of death

in the United States is cardiovascular disease (54 percent of deaths), and yet the number of pathologists who are expert in this subspecialty is minuscule. As a consequence, the majority of autopsies are performed by nonspecialists in the condition responsible for the patients' death."

It is interesting to note that despite the downward national trend in autopsies, they continue at a high rate among certain specialties such as pediatrics, neurology, and neurosurgery. "People in these fields," Dr. McCluskey commented, "are highly motivated to learn whatever information the autopsy can supply."

Dr. McCluskey credited Dr. Schiller for much of the success of the MGH in maintaining its higher-than-average autopsy caseload.

"He has been very vigorous in stressing the importance of the autopsy service," the Chief of the Pathology Department declared. "He has spoken at length not only to other doctors but also to leaders of the clergy and to funeral directors."

Through the ages postmortems have enabled medical science to make great progress. To countless members of the healing profession, there is still much that the living can learn from the dead.



Using a terminal linked nationally to organ centers, Dr. Thomas C. Fuller and Miss Marilyn Farrell, RN, update a computerized list of patients in need of transplants.

Network of Organ Centers Aids Donor Hunt

(Continued from Page 5)

able cargo at Logan. They delivered the lymph tissue to Dr. Fuller at the MGH, then took the kidney to the bank's Organ Preservation Laboratory at the Veterans Administration Hospital in Boston's Jamaica Plain district to be held ready for use.

Two years ago the patient, for whom the organ was intended, underwent dialysis three times weekly to rid his own kidneys of impurities. Then he received a transplant. Now, that transplant was failing, and dialysis loomed again.

By coincidence, he was at the MGH Transplant Clinic for a checkup when word came of his good fortune. He was admitted to the hospital and by eight o'clock the next morning Dr. A. Benedict Cosimi, Chief of Clinical Transplant Surgery, and Dr. Shield had installed the new kidney in the 43-year-old patient. It functioned well.

"This patient's chances of receiving a compatible kidney would have been virtually nil," said Dr. Fuller, "had it not been for a nationwide system called the United Network for Organ Sharing [UNOS]. The system has increased the size of the potential donor pool accessible to our transplant candidates by at least 15 fold.

"The man had a high degree of immunity to the tissue of all but a few individuals in the world. Yet, thanks to UNOS, we succeeded in obtaining tissue almost identical to his own."

A few weeks earlier an MGH patient received a kidney sent from Atlanta, Ga. The organ had been removed from the body of a 10-year-old child. Just hours after the transplant surgery, the middle-aged patient said in exultation, "I feel marvelous, as if I were 20 years younger!" In reality the use of a young person's kidney does not provide an older recipient with a fountain of youth.

UNOS, which the MGH joined a little more than six months ago, links organ procurement and transplant centers in about 85 percent of the continental United States as well as areas of Canada. The network maintains a computerized registry of patients in need of transplants.

"Most donated kidneys are used locally," Dr. Fuller declared, "but when an appropriate match with a prospective recipient cannot be achieved, the kidney is then offered through UNOS to another region."

Since its founding 10 years ago, the Interhospital Organ Bank, based in Boston, has procured more than 1,000 kidneys from donors upon their death.

The MGH's Dr. Benjamin A. Barnes, the bank's Secretary-Director, said that more than 50 percent of the recipients still had a functional kidney a year after transplantation. He added that the success rate is gradually increasing.

The vast majority of recipients whose new kidneys fail are able to return to dialysis treatments.

Under the Federal Government's

End Stage Renal Disease Program, the cost of kidney transplantations and dialysis treatments is borne entirely by Medicare.

Dr. Paul S. Russell, Chief of the MGH Transplant Unit, helped to organize the Interhospital Organ Bank and served as its first board chairman.

"The Peter Bent Brigham Hospital pioneered in kidney transplants in the 1950s, and the MGH was the second hospital in this part of the country to become involved," he said. "We saw a need to help each other and held a number of meetings. Other university hospitals became interested and soon the organ bank came into being."

Throughout New England, major hospitals associated with the bank are assigned geographical regions in which to seek and obtain organ donations.

Although the bank deals predominantly with kidneys, it also seeks to fill a need for corneas, skin, and bones for transplantation.

"We collaborate closely with the Eye Bank of the Massachusetts Eye and Ear Infirmary in providing corneas," Dr. Barnes declared. "Very often a kidney donor will also supply a cornea.

"Much of the skin we receive is sent to the Shriners Burns Institute adjacent to the MGH to help severely burned children. As for bones, they have been used by the MGH Orthopaedic Service to replace ones destroyed by tumors."

The organ bank has established strict standards for the use of kidneys. The donor must have been free of any systemic bodywide infection or malignant tumor. Any previous kidney disease or any disorder commonly associated with it, such as high blood pressure or diabetes, also marks the organ as unacceptable.

The MGH Orthopaedic Service insists on equally rigid standards for qualifying bone. The requirements for obtaining corneas and skin are not as severe.

Dr. Russell, who is John Homans Professor of Surgery at Harvard Medical School, pointed out that organs must be removed as quickly as possible after the death of a donor.

In the United States, either heart or liver transplantations are still undertaken by only a handful of medical centers, all situated outside of New England. Organ banks in their areas, however, strive to help meet the needs of the institutions.

Even a Mild Disease Can Pack a Wallop

A few years ago on a college campus in the Northeast, a husky young football player put on his uniform for a game even though he had not been feeling well for several days.

Suffering from a fever, sore throat, swelling in the neck, tenderness in the abdomen, and general fatigue, he considered reporting in sick but decided to play because this game was so important.

Midway through the first half, a tackler slammed him to the ground, and he could not get up. At a nearby hospital he was found to have a ruptured spleen. Despite prompt medical intervention, he died from shock and loss of blood.

If the young man had passed up the game and sought medical help for his illness, he could have confidently anticipated full recovery.

The student was suffering from infectious mononucleosis, a normally mild disease involving an unusual increase

in certain types of white blood cells (lymphocytes and monocytes). The signs often include an enlarged spleen—an abdominal organ which performs important blood functions—and swollen lymph glands in the neck.

Having an enlarged spleen due to mononucleosis predisposed the football player to his uncommon, fatal injury.

Each year, a significant number of students report to college infirmaries with the disease familiarly known as "mono." Contrary to popular belief, as many as 85 percent continue their studies at a normal pace while the illness runs its course.

Moreover, college health officials estimate that on the average campus the toll of mono victims probably equals three times the number actually diagnosed.

The undetected episodes are usually so mild or fleeting that the students affected just do not bother to report their illness.

Although generally labeled as a benign, nondescript, not very contagious sickness, mono can pack a wallop.

The minority of patients who wind up confined to bed are often very ill. Many have throats so sore from swollen tonsils or adenoids that they are unable to swallow. On rare occasions, a tracheotomy (incision into the windpipe) must be performed to facilitate breathing.

The symptoms develop with increasing intensity during the first four or five days of the sickness. Fever commonly climbs as high as 103° Fahrenheit. Full recovery may take two months or longer.

Rest is the key to getting well. Physicians stress the importance of avoiding overexertion and participation in contact sports.

Aside from medication to ease the discomfort of head or muscle aches, drugs play no part in the treatment of the average mono patient. In severe cases, physicians may turn to a corticosteroid, a member of the cortisone family. But, because of the possibility of undesirable side effects, they prefer not to.

Complications from mono can occasionally be very serious. In addition to rupturing a spleen, a patient can develop an inflammation of the brain (encephalitis), can suffer a neurological disorder called the Guillain-Barre syndrome, which is fatal in about five percent of cases, and can have problems with the body's immune system leading to the destruction of red blood cells.

"At the MGH, we see more of the complications than we do of the ordinary infections," said Dr. Martin S. Hirsch, Director of the Virology Laboratory in the hospital's Infectious Disease Unit.

Two types of mono-inducing viruses predominate: the Epstein-Barr virus (EBV), which affects 80 percent or more of all mono patients, and cytomegalovirus (CMV), which accounts for most other episodes of the disease.

"Both types belong to the herpes group of viruses," Dr. Hirsch said. "CMV causes the same blood picture, fever, fatigue, and general malaise as EBV, but ordinarily does not cause sore throat or swelling of the cervical [neck] lymph nodes.

"CMV is more likely than EBV to

At the MGH, laboratory investigators are exploring benefits that diabetics might derive from transplantations of the pancreas or the "Islets of Langerhans," that portion of the pancreas which produces insulin.

"The treatment of diabetes, of course, was revolutionized by the discovery of insulin," Dr. Russell remarked, "but diabetes causes secondary effects in many people who without insulin would have died before these adverse side effects ever occurred. Blindness, impairment of the heart, and poor blood circulation to the legs can result.

"The reason for these secondary effects is not very clear. We wonder whether the insulin that diabetics take really regulates their metabolism smoothly enough. A new pancreas or 'Islets of Langerhans' might control the diabetes better."

In the future, as now, transplantations will depend on man's willingness to give a physical part of himself to help others.

Registering as a donor can be accomplished in any one of several ways.

"Convince your family that donating is your desire," Dr. Barnes suggested, "and mention this in your will to emphasize your sincerity.

"You can also obtain an anatomical

donor card from the Kidney Foundation. Sign the card and keep it in your wallet or pocketbook.

"And in a score of states, including Massachusetts, there is a place on the driver's license where one may designate himself as a donor. Personnel in hospital emergency wards are instructed to check for such a designation in cases of sudden death."



A newly donated kidney arrives at the MGH.

(Concluded on Page 8)

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Infectious "Mono" Often Escapes Detection

(Concluded from Page 7)

enlarge the spleen and also to disrupt liver function temporarily."

Mono can be extremely deceptive. At times it is confused with leukemia because of a similarity in the way the abnormal blood cells appear under a microscope.

Dr. Hirsch, an Associate Professor of Medicine at Harvard Medical School, told of a young college student who was transferred to the MGH from another hospital with a disease tentatively diagnosed as herpes simplex encephalitis, a malady with a 70 percent mortality rate. Few survivors escape significant defects.

"The disease required confirmation by means of a brain biopsy prior to institution of specific therapy," he said, "but before doing this we decided to check out the possibility that the young man might have mononucleosis.

"Since it was a Saturday, Bill Corbett, who supervises the serology section of the Bacteriology Department, was called in from home to conduct the necessary test. He found that the patient was suffering from EBV mononucleosis, not from herpes simplex encephalitis.

"The college student was spared a brain biopsy and recovered fully without any special medical treatment."

Dr. Hirsch emphasized that patients can be put through a whole range of unnecessary tests and even be misdiagnosed unless the possibility of mono is on the doctors' minds, and they carry out the appropriate diagnostic studies.

"This is one of the reasons why our diagnostic laboratory was established several years ago," Dr. Hirsch added. "We pointed out a number of instances where ill-defined illnesses were subsequently diagnosed as CMV mono, thereby saving patients from extensive testing and possibly long hospitalization."

Studies indicate that the EBV virus

spreads via the mouth and that close contact is necessary to infect another individual. This explains why the condition was once referred to even in medical circles as a kissing disease.

On the other hand, the CMV organism is excreted in a number of places, including the genital tract. "There is some evidence that it can be transmitted venereally," Dr. Hirsch commented.

In the less developed countries of Africa, Asia, and South America where urban populations are large and sanitary conditions are often poor, mono is rarely detected. *An estimated 80 percent of the people in these areas develop EBV or CMV infections by two years of age, but they go unrecognized. The children recover quickly and from then on enjoy an immunity.*

In highly developed nations, such as the United States and those of western Europe, many children either reach adolescence or adulthood before being infected, or escape mono altogether.

Theories abound to explain the increased severity of the disease at this time of life. One of them attributes the discomfort to the vigorous response of the body's disease-fighting mechanism rather than to the direct effect of the

virus itself.

Financed by grants from the National Institutes of Health, investigators at the MGH and other medical centers are studying certain antiviral compounds which may prove useful in treating the diseases caused by EBV or CMV.

One drug, adenine arabinoside, has undergone patient trials for various herpes group infections other than mono. "There is some evidence that the drug is active against both CMV and the EBV," Dr. Hirsch said.

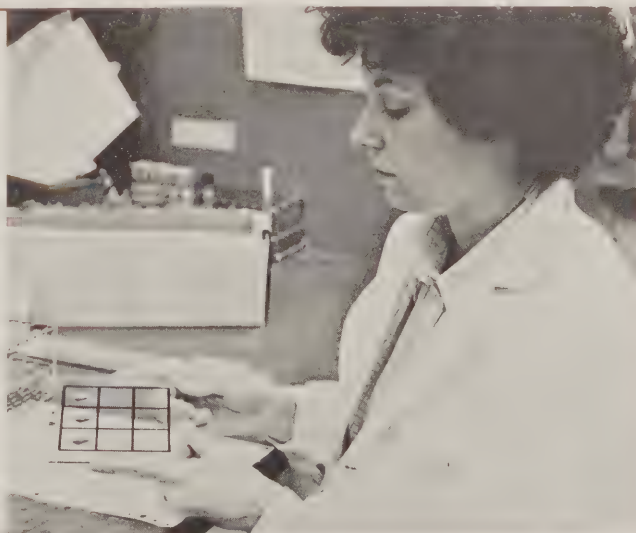
Another agent, called interferon, a natural product of cells, also has demonstrated some activity against CMV during studies involving kidney transplant patients.

Neither substance, however, has undergone formal, controlled tests to determine any direct effect against mono.

Researchers in the United States and England are working on a CMV vaccine, but Dr. Hirsch said many inherent risks are involved. Aside from mono, CMV causes numerous problems, the most important one being defects in the newborn.

"I'm afraid it will be a long while," Dr. Hirsch asserted, "before we have vaccines to protect the general population against the CMV or EBV forms of infectious mononucleosis."

Mrs. Debra Sanders, Technologist in the serology section of the MGH Bacteriology Department, screens a blood specimen for "heterophile antibodies" which are found in classical infectious mononucleosis.





MGH *News*

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MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS

December, 1978

Revised Strategy Quickens Assault on Child Abuse

Pedaling Toward a Healthier, Happier Life

Did you ever start exercising only to decide minutes later that you "had had it"?

Did you sink breathlessly into a chair, forced to concede that you were "out of shape"?

One of the most common complaints heard by specialists in lung (pulmonary) care, shortness of breath during exercise can mean many things.

"The individual may have pushed himself to a normal limit," said Dr. David J. Kanarek, Director of the MGH Pulmonary Function Laboratories, "or his limit may prove to be less than one would expect from a person of his age and build, thereby indicating the possible presence of some disorder."

Since exercise encompasses the interaction of lungs, heart, blood vessels, and neuromuscular and metabolic activities, its study has been a formidable, time-consuming process, necessitating the collection and analysis of a mound of data.

In the MGH Pulmonary Unit, however, computers have greatly simplified the problem, permitting an evaluation of several patients in the time previously required to study one.

For almost a year, Dr. Kanarek's staff has employed a computer-based system of testing to help resolve a variety of situations dealing with exercise tolerance.

While pedaling a stationary bicycle, a patient is forced to exert an ever increasing degree of energy because of mounting resistance from electronically controlled brakes.

Meanwhile, measurements are recorded of the quantity of air entering the lungs each minute, the levels of oxygen distributed from there to the rest of the body, and the amount of carbon dioxide expelled from the body through the lungs.

To protect the patient during the test, an electrocardiograph monitors his heart. Any irregular heartbeats (arrhythmias) would automatically abort the exercise.

When the patient reaches what he claims to be his maximum output of energy, the test is concluded.

"The amount of oxygen that the patient consumes, in relation to his body

(Continued on Page 2)

A hundred years ago a little girl, brutally beaten by her stepmother, was carried into a New York courtroom, and a demand was made upon the judge to transfer the child to another home.

The sight of the pummeled form of Mary Ellen, wrapped in a horse blanket, aroused such pity that men wept.

No laws then existed to protect children, but the judge acquiesced in the removal petition by invoking a statute that banned cruelty to animals.

The case shocked the public out of its apathy toward child welfare and led in 1878 to the founding of the American Society for the Prevention of Cruelty to Children, now known as Children's Protective Services (C.P.S.).

Despite the efforts of C.P.S. and other groups over the past century, the campaign to halt child abuse and neglect is far from over. This year more than 1,000,000 American children will fall victim to the continuing tragedy.

Among programs to counter this is one begun unannounced two years ago at the MGH-Chelsea Health Center. Called the Child Care Project, it is drawing ever increasing attention because of several novel approaches to the problem.

The program is believed to be the only protective contract service in the Greater Boston area operating out of a community health center, where children at risk are often first identified.

The program both assesses reports of child abuse and neglect and also offers treatment.

The treatment methods include case-work, group work, and a newly begun Parent-Infant/Toddler program. Psy-

(Continued on Page 4)



A silent appeal



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EDITORIALS:

Now Really, Virginia

Hospitals see all the extremes of emotion that life can present. Nothing can be more devastating than to stand by helplessly while a child is dying. Nor is anything so exhilarating as restoring to normal life someone who seemed doomed to die. The pressures imposed on health caretakers are thus enormous.

No wonder then that health professionals sometimes need to escape from the real world. A feature article on page 7 of this issue describes a unique MGH mode of escapism: the annual admission of Santa Claus to one of the surgical floors. Fortunately Christmas week is traditionally a time of a few empty beds. Having to turn away Santa some Christmas would be like having a stark, undecorated Christmas tree or a fireplace without a stocking. No Santa Claus? Now really, Virginia.

Abusing the Loved Ones

Maltreating a child is probably the surest way to invoke public wrath. The spate of attention recently focused on child abuse underlines this point. In the typical case the battered child draws sympathy like a strong magnet attracts steel filings.

Child abuse, though, comes in a variety of sordid packages. Often the most seriously abused youngster shows no sign of a beating. He may be confined, impeded, or otherwise neglected. He may be sexually abused. Or he may be psychologically tortured rather than physically harmed. The scars of psychological abuse may linger a lifetime, often far outlasting the visible reminders of a beating. The abuse that parents inflict may be subconsciously motivated. At times they even take an action which they avow is in their child's best interest when at some level they may know it is not.

Perhaps the strangest aspect of the abuse is that most perpetrators love the very children they batter. The youngster may be a symbol of something that has soured in a parent's life. The parent may be reliving his own childhood when his own parent beat him. Perhaps the child represents the freedom the parent was forced to abandon when the young one was born.

Whatever the motivation for the abuse, its grossness provokes public antipathy, not sympathy. And that is probably the most important reason why people find it so difficult to believe that the preponderance of parents actually do love the very children they abuse. Nothing, but nothing, excuses injuring a child. What an awesome guilt the parent faces bearing for life the knowledge that he has harmed, perhaps irrevocably, the object of his love. Despite its truth, the very statement sounds incongruous.

Cycle Breathing Test Can Reveal Cause Of Low Energy

(Continued from Page 1)

size, of course, gives a pretty good idea of his fitness," Dr. Kanarek said. "A very fit person can take up a lot of oxygen. Someone not in good physical shape would use less, and a person afflicted with a serious disease would find his oxygen uptake further limited."

The level of carbon dioxide and acid in the patient provides added evidence of how well his body is functioning. As it loses peak efficiency, it labors under more acid and, sometimes, carbon dioxide in the blood, and that increases the amount of work that the person has to do to breathe.

The values derived from the test are compared to the known responses of a normal, moderately fit population. To further assess the patient's reaction to his exercise workload, the physician relates the values to each other.

Attainment of maximum breathing capacity before the heart reaches its known rate limit would signal a lung problem. Conversely, if the patient's heart rate appears to reach its limit but he still can breathe without much difficulty, a heart disorder would be indicated.

If no evidence of either a heart or lung irregularity arises, but other problems occur such as muscle weakness or excessive acidity in the blood, the investigators can then deduce that the ailment is at the muscle or metabolic level.

Evidence of a heart condition would lead to referral of the patient to a cardiologist for further diagnosis, then treatment.

Dr. Kanarek, an Assistant Professor of Medicine at Harvard Medical School, said physicians referred most of the more than 250 patients who have undergone the exercise test in the Pulmonary Unit.

"The doctors had a pretty good idea of what the problem was," he said. "What they wanted to know was, 'Am I right or wrong?' and 'If there is an

Photographs: Pages 1, 5, courtesy of Children's Protective Services; pp. 3, 4, 6, 7, Myron Daniels; p. 8, courtesy of White 7.



Preparing to demonstrate the exercise test procedure, Dr. Jay E. Blum, a Fellow in Exercise Physiology, adjusts headgear worn by Mrs. Jean Sullivan, Chief Technician in the MGH Pulmonary Unit, who posed as patient.

impairment, how severe is it?"

By ascertaining the extent of any pulmonary disease, Dr. Kanarek and his staff can prescribe carefully limited exercise programs to help improve the functional capabilities of most of the affected patients.

The exercise testing system is frequently used to determine the degree of physical fitness in normal individuals and to set realistic training goals for them.

Top-notch skiers gearing for the 1980 Winter Olympics, members of Greater Boston cycling clubs, and oarsmen of the Harvard crew are among athletes who have taken the MGH test.

"The skiers who came down from Vermont wanted to know specifically where they stood in their training program and whether they were actually making progress," Dr. Kanarek remarked.

"One skier, an excellent athlete, didn't perform very well in the exercise test. When we informed him, he revealed that his coach had been telling him, 'Your problem, my friend, is that you don't train hard enough. You could really be good.'"

"The skier thought his training schedule was as rigorous as it could be, but the exercise test showed he could safely work harder. He did, and another test taken some time later confirmed the effectiveness of the additional workouts."

On occasion, patients attending the MGH Runners' Clinic (*MGH News*, May 1978), have been referred to the Pulmonary Unit for testing not only to determine their level of fitness but

also to prescribe how far they can go in launching a training program.

Tables are available which relate in terms of oxygen consumption per minute the amount of work entailed by various kinds of exercise.

Walking on level ground at about 3 miles per hour, for instance, would require 1 liter of oxygen. Being doubly difficult, climbing stairs would call for twice as much oxygen.

A jogger running an average 7-minute mile on level ground would consume about $3\frac{1}{2}$ liters of oxygen. The average bicyclist would need between $1\frac{1}{2}$ and $2\frac{1}{2}$ liters.

The exercise testing system has been used to verify worker disability claims. Someone may insist that he "can't get

up that ladder again" because he gets out of breath. Is the complaint justified?

"The worker may be very depressed for some reason and confusing this with physical incapacity," Dr. Kanarek stated. "In other words, he may simply feel so miserable that he doubts his ability to climb high above ground on a ladder."

"Some patients sent here were thought to be malingerers and turned out to have heart problems. Others, believed to have a heart condition, were found to have clots in their lungs."

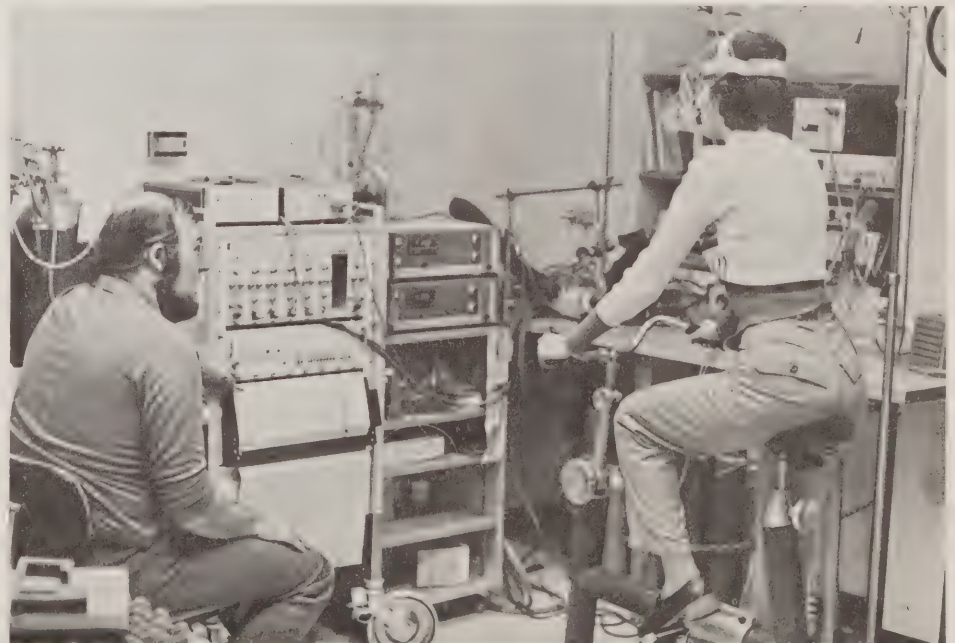
The test takes only about 10 minutes, but the preparation, including the hook-up of necessary paraphernalia, can occupy 20 minutes.

"I think we have only just begun to explore the many possibilities with the system," Dr. Kanarek said. "I think recognition of its value will become much more widespread."

In Eastern Europe where the testing has enjoyed much popularity, doctors have used the machinery primarily to help improve athletic performance. The MGH plans to emphasize the care of the sick.

Dr. Kanarek envisions a splitting of the two responsibilities: one system set up to manage relatively healthy individuals who primarily seek advice on training and another to manage patients in direct need of medical care.

The doctor explained that those in training can be tested without very sophisticated equipment. Caring for the sick, however, demands more extensive tools and knowledge.



Exercise Technician Barry Callahan maintains a close watch on Mrs. Sullivan as cycle equipment forces her to expend increased energy.



Miss Deborah Hill, Director of Child Care Project, discusses child abuse and neglect at an MGH Grand Rounds in Psychiatry.

Parent Aides Join Fight Against Child Abuse

(Continued from Page 1)

chiatric and legal consultations are an integral part of the project.

City and federal funds help to finance the Chelsea services which are provided under a contract with the Massachusetts Department of Public Welfare.

Heavy emphasis is placed on continuity of care. Because the solution of a family's internal difficulties demands faith and trust in someone outside the home, the same social worker attends that family's needs throughout the entire care process.

"Additionally, a parent aide serves as an adjunct to the social worker," said Miss Deborah A. Hill, Director of the Child Care Project. "The aide, chosen from among Chelsea-area mothers who use the health center, fully understands the anxiety that poverty and isolation can generate. She serves as a role model, someone another parent can try to emulate."

"Calling at a home, the aide begins to provide for some of the parent's own unmet needs—consistent caring, reliability, sound help with decision making—so that the parent can better meet those needs in her own children.

"Sometimes parents become totally isolated within their home. By inviting a parent out for a walk, a cup of coffee, and some conversation, an aide can often alleviate buildups of stress threatening the family unit."

The aide, who may be bilingual, also can assist the family by pointing out

how to obtain a host of available community services.

Dealing with a problem before it develops has prevented many heartaches. Members of the health center staff are trained to recognize warning signs of impending abuse and neglect.

A woman receiving prenatal care at the center delayed making arrangements for her baby's arrival and seemed very depressed. A check of her history disclosed that her three older children had been placed in foster homes.

"We were called in because this was clearly a lady at risk who was going to have a baby at risk," Miss Hill explained.

A preventive service program was initiated before the baby's birth. Now, a year later, mother and child enjoy a healthy bond.

Some referrals to the Child Care Project follow outright appeals from a member of a perturbed family. Calling on an adult care practitioner at the MGH-Chelsea center, a parent complained, "My kid is driving me straight up a wall. I don't know how much longer I'll be able to control my temper. I'm worried." The physician directed the concerned individual to Miss Hill's group.

Members of her staff include Elizabeth Bishop, Marybeth Bronson, and Maureen Manley, all of whom hold Master's degrees in Social Work; and parent aides Haydee Calderon and

Marie Casaletto.

Speaking recently at an MGH medical meeting (Grand Rounds in Psychiatry), Miss Hill, who also holds a Master's degree in Social Work, decried news accounts of glaring child abuse and neglect, saying they have created a notion that offenders in general are sadistic.

"This is absolutely not true," she stated. "The vast majority of parents we see don't want to hurt their children. In fact, usually there is a great deal of love. These adults are simply troubled and need help. Given that, most are then able to care for their youngsters properly."

A perennial roadblock to such aid has been a widespread public feeling that reporting an offense, as the law requires, constitutes both a punitive action and an invasion of a parent's privacy.

"People who feel this way have simply not witnessed the relief that can be forthcoming as a result of intercession by trained caretakers," Miss Hill said, and she emphasized further, "There are no grounds for fears that notifying the Public Welfare Department automatically means placement of the child in a foster home."

Of 135 families referred to the Child Care Project since it started, nearly all underwent treatment programs, but children from fewer than a dozen homes had to be moved elsewhere.

All states have reporting laws. In late 1973, Massachusetts broadened its statute to include more professionals in such fields as medicine, education, and law enforcement who must report evidence of juvenile mistreatment. Failure to obey the mandate carries a \$1,000 fine.

At the time the law was amended, Massachusetts counted 900 reported instances of alleged mistreatment of children annually. The figure covering the first half of this year alone reached a remarkable 6,800.

How many resulted from compliance with the law and how many represented a "hysterical reaction" to news stories that frightened people, no one can say. However, a recent survey of reports made to the Public Welfare Department showed that in one typical month 78 percent of the episodes were serious enough to warrant a thorough investigation.

In assessing whether injury to a child resulted from parental mistreatment, members of the Child Care Proj-

ect look for certain behavioral patterns in adults which often signal a capacity to strike out.

The parent capable of battering may: reject or act indifferently toward his child, harbor unrealistic expectations of the youngster, impose extreme codes of discipline, and be depressed or withdrawn.

The likelihood of an abusive event may heighten if the child is provocative, hyperactive, or carries some physical burden because these conditions may underscore the parent's own sense of defectiveness.

Does the parent react abnormally in his or her daily life to minor crises such as the breakdown of a washing machine or the loss of a baby sitter?

Does the parent lack someone to turn to—a lifeline, if you will—in moments of stress?

In children, silent appeals for help can be detected in such behavioral traits as unusual fearfulness, withdrawal, repeated accidents, delayed development, a tendency to take over the care of parents, and an excessive thirst for affection.

"If we could just pick up a family's first warning flag of trouble and not have to wait until something awful has happened and allegations have been made, we could do a great deal to prevent a crisis," Miss Hill remarked.

In addition to her role at the MGH-Chelsea Health Center, Miss Hill coordinates at the MGH itself a Trauma Team consisting of a social worker,



pediatrician, child psychiatrist, pediatric nurse, and attorney.

Miss Elizabeth Hogan, RN, a team member, pointed out at the Grand Rounds that to develop feelings of trust and worth each child requires love and security. Therefore, each nurse in pediatrics strives to maintain the integrity of the family.

When infants from disturbed families are hospitalized, the nurses encourage parents to touch, hold, and feed their babies during visits. In devising care programs, the nurses honor the wishes of the parents as much as possible.

When parents are unable to visit, reports on their child's progress are made daily to them by phone, and pictures are mailed. The baby is always identified by his given name.

In treating an older child, a pediatrician may call in a psychiatrist to root out and describe the patient's inner feelings. The youngster may have convinced himself, for example, that the only way he can gain the attention of his parents is by doing something wrong.

Dr. Steven L. Nickman, a Trauma Team member and Director of the MGH Child Psychiatry Clinic, said abuse and neglect are not confined to physical harm. A new relationship between law and child-rearing practices is taking shape, he said, as the concept of psychological and emotional mistreatment is studied, understood, and accepted.

When is it safe for an injured child to return home from the hospital? The Trauma Team first asks: Has the crisis which caused the abuse been settled? Do the parents want the child back for positive reasons? When the problems arise again, will the family accept the outside help which has been provided for?

Miss Hill stressed the need for additional social workers to maintain the continuity of care so important in winning over and holding a family's trust.

"There is always a danger," she said, "that ending a relationship with a family too early will wipe out all of the gains that have been made."



Trace Minerals Play An Important Part In the Daily Diet

Several years ago when the Apollo 16 spacecraft traveled to the moon, the astronauts on board were required to gulp gallons of a spiked orange drink.

The drink contained potassium, a mineral which affects virtually every organ system in the body and is particularly crucial for the proper contraction of heart muscles.

Space agency doctors ordered the diet supplement because during the earlier moon flight of Apollo 15, the ship's crew lost at least 15 percent of the potassium in their bodies and exhibited heartbeat irregularities.

Reinforcement of the potassium supply enabled the hearts of the Apollo 16 astronauts to better withstand the physiological strain of living in a weightless environment.

Physicians have long recognized the importance to health of minerals such as potassium; calcium and phosphorus for sound bones and teeth; iron to help red blood cells carry oxygen throughout the body; and iodine to maintain proper functioning of the thyroid gland which regulates growth and development.

Iron was identified in blood as long ago as 1713. Researchers isolated iodine in 1812. Not until the early



Pharmacist John Szabo exercises utmost precautions as he fills a syringe with a newly prepared mineral solution to inject it into an IV feeding bottle.

Using an analytical balance, Jay Amin, an MGH pharmacist, weighs quantity of cupric (copper) sulfate needed in a liquid diet to be fed intravenously to a patient.



1960s, however, did scientists evolve methods sophisticated enough to study a host of other mineral elements present in the body in such tiny quantities that they became known as "trace elements."

"If one looks hard enough," said Agnes M. Huber, Ph.D., a leading nutritionist, "one can detect in the human body virtually every mineral found in nature, even gold and silver."

More than a dozen trace elements are regarded as essential to animal life. Among the most critical is zinc. The body contains approximately two to three grams (about half the weight of a five-cent coin) in contrast to the presence of about three pounds of calcium.

Although zinc was identified in the early 1930s as essential to humans, the consequences of a deficiency of this mineral did not come to light until many years later in Iran and Egypt.

Researchers in those countries discovered that boys subsisting on diets largely devoid of animal protein were suffering from dwarfism, lack of sexual development, an enlarged spleen and liver, and anemia. In addition, they had a habit of eating clay or earth, a peculiarity called geophagia. Zinc supplements in the diet helped to overcome the various problems.

Zinc deficiency is also believed the cause of a severe familial disorder characterized by chronic diarrhea, wasting away, loss of hair, and skin lesions over much of the body. Administration of zinc brings dramatic relief from the malady (acrodermatitis enteropathica) which untreated would prove fatal.

Zinc is an ingredient in more than a score of enzymes which promote chem-

ical reactions in the body. Inadequate amounts of zinc are known to impair the senses of taste and smell. Drugs to combat infections may often cause this depletion and symptom.

A member of the Advisory Committee on Educational Planning for Dietetic Interns at the MGH, Dr. Huber said very little surveillance is conducted on the amounts of trace minerals in similar foods produced in different regions "and that is one of the big problems we nutritionists have to deal with."

She explained that the same kinds of foods grown in different soils may be quite different in their trace mineral contents.

In some areas of the midwestern United States, the soil is so rich in the metallic element selenium that grazing animals become sick.

Some investigators, however, believe that higher levels of selenium in man result in lower rates of high blood pressure and certain cancers, but no conclusions have been reached.

Selenium helps to protect human tissue from damage by oxidation. How much of the mineral the body needs is uncertain since selenium can be obtained in both organic and inorganic forms, and each also has subgroups of varying makeup. The intestines absorb these various forms at different rates.

Fluoride, obtained mainly from water, has been proven highly protective against dental decay when in concentrations of about one part per million. Raising the concentration to only three parts per million, however, sometimes causes harmless but unsightly mottling of teeth.

Getting in Shape for a Busy Night Out

They're making up his bed again on White 7, the East Surgical floor.

The Admitting Office has not yet sent word of his impending arrival, but each year since 1955 he has suddenly appeared, pale and plump, in the MGH Emergency Ward one week before Christmas.

His medical record, patient unit number 000-00-00, is several inches thick. The litany of ills inscribed within by a cross section of health professionals is long, but, after all, for someone several centuries old. . .

Before he concludes his annual one-week stay, he is presented at a Grand Rounds in the MGH's Bigelow Amphitheater.

Addressing a full house of doctors, nurses, medical students, technicians, and others who manage to squeeze in, the chief surgical resident from White 7 recites the medical history of his roly-poly, white-bearded patient and then recounts the latest complaints and treatment.

The elderly gentleman, who has a passion for red, usually makes his ap-

pearance known in the EW by tapping a resident on the shoulder. "Can you give me something for my bursitis?" he asks. "I can't get this bag onto my shoulder."

In stuffing his mountainous sack with toys and goodies for millions of tiny tots, he also isn't above sampling the sweets.

"A classic case of jelly-belly syndrome," the residents in the EW would write in the medical record.

Realizing this is no small problem, the doctors transfer their patient to the Overnight Ward for a complete work-

(Concluded on Page 8)

Areas of the nation dependent on water from deep wells have the greatest quantities of fluoride. In Massachusetts, fluoridation programs were carried out because the state relies on surface water which is low in the mineral.

"A well-balanced diet would contain all of the trace elements needed by the body," said Dr. Huber, who teaches at Harvard and Boston Universities and is also Director of Nutrition at the Eunice Kennedy Shriver Center for Mental Retardation in Waltham, Mass. But she stressed "well-balanced."

"One has to remember that there are many refined foods in the American diet," she warned, "and refined foods are usually very low in trace minerals."

A United States Senate Subcommittee on Energy, Natural Resources and the Environment once heard testimony that the milling of wheat into refined white flour removed 40 percent of the chromium, 86 percent of the manganese, 76 percent of the iron, 89 percent of the cobalt, 68 percent of the copper, 78 percent of the zinc, and 48 percent of the molybdenum, all naturally present in the grain and essential for good health.

The body, for example, uses copper to help iron build hemoglobin, an important part of red blood cells. Cobalt is contained in vitamin B12, which protects against a blood disease called pernicious anemia. Manganese appears to be involved in brain function. Laboratory animals deficient in manganese are more prone to convulsions.

Researchers have associated chromium with the glucose tolerance factor, claiming that a shortage of the metallic element can produce diabetes-like symptoms. Investigators are trying to

learn whether chromium is required for proper insulin action.

Dr. Huber said many trace minerals are involved in prenatal development of the fetus.

At the Shriver Center, Dr. Huber is directing studies to learn what disorders may be inherited by children of alcoholic mothers. "Alcohol is one of the factors which influence trace minerals," she said.

A committee of the National Nutrition Consortium, representing more than 50,000 scientists, clinicians, and educators, has warned that indiscriminate consumption of mineral supplements can be very hazardous.

According to the committee, the margin of safety between the requirements and toxic levels for some trace elements is small, and disproportionate intakes of a single mineral may diminish the absorption and utilization of other minerals.

"We still have much to learn about mineral interrelationships," Dr. Huber stated, "but we do know, for instance,

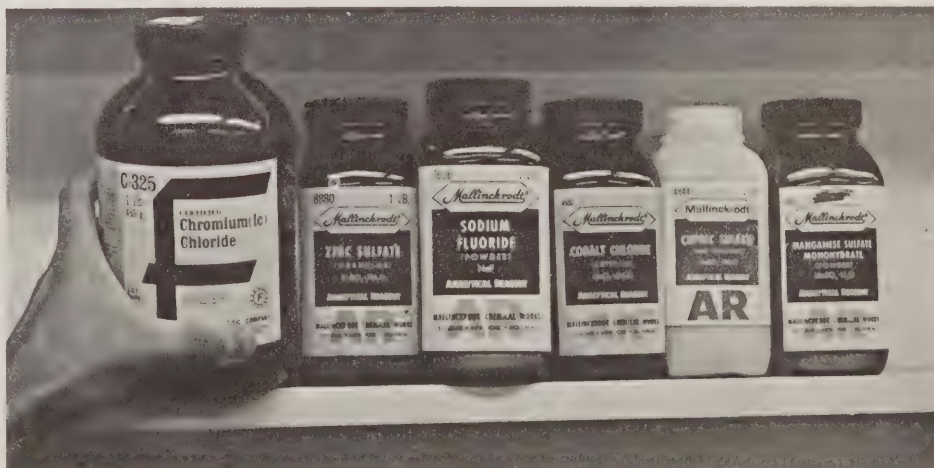
that if you increase the zinc intake excessively you interfere with copper absorption, and you can precipitate a copper deficiency which might lead to iron deficiency anemia. This anemia is the leading nutritional disorder among infants and pregnant women."

Among the newest trace elements detected in the body are vanadium, silicon, and tin. Vanadium has been identified with the body's manufacture of cholesterol.

"We think silicon is associated with collagen [a principal component of connective tissue]," said Dr. Huber, "but this is mainly a hypothesis at the moment. Since silicon is also found in certain levels in milk, we believe it may play a role in the development of babies."

As for tin, there lies a real mystery. Most of the research has been carried out on chickens, and it has shed no light on what, if anything, this mineral may do for humans.

The only finding thus far is that tin helps to make feathers.



At least a dozen trace minerals are essential to animal life.

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Santa's Checkup Creates Holiday Mood

(Concluded from Page 7)

up extending from his mistle-toes, which he keeps stubbing on television antennas, to the ringing in his ears that sounds like sleigh bells.

During one visit, he made it almost impossible for technicians to take X rays. The patient refused to remain still. "Ho, ho, ho," he kept saying, and he would ask every technician passing by, "Have you been a good little boy?"

Usually, however, the films disclose an X-mass in the abdomen, and the orders go out to get a bed ready on the East Surgical floor.

Once the gentleman became very agitated. His "ho, ho, ho" began to sound like "tow, tow, tow." Somebody in psychiatry figured out that the patient had parked his sleigh on Beacon Hill and was supposed to move it every two hours. Arrangements were made to park it in the Boston Common underground garage.

During his stays on White 7 while awaiting possible surgery, the bearded man who has always refused to take his red cap off would be visited daily by members of the staff on rounds with young residents.

The orders of the day would be spelled out. Sometimes the IV bottles by the bed would contain something red, or blue, or pink.

Nurses would constantly disappear behind the curtain drawn around the bed. Another patient in the room once became curious over laughter he kept hearing and inquired of one of the nurses, "Who have you got back there?"

"Why Santa Claus, of course," came the reply.

"There you go again," he remarked, somewhat exasperated. "Always telling me stories."

Riding on a stretcher, instead of a sleigh, the famous visitor would be

taken to various parts of the hospital for more tests before finally reaching the operating room.

Invariably, his increasingly warm feeling as the holiday drew near would be attributed to the X-mass in him, and the doctors would decide to leave well enough alone.

As for that jelly belly, the patient said he didn't really mind being plump, but the condition often created hang-ups: He was growing wider than the chimneys. And, frankly, he admitted, going up and down those new-fangled high risers can tucker one out.

He was given a special reducing plan devised by the Dietary Department, but he soon gave that up. After all, he argued, how many times can a person eat snowflakes for breakfast?

Finally, on Christmas Eve, the nurses on White 7 would hear a loud "Ho, ho, ho. I now have to go!" Hurrying to Santa's room, they would find

his bed empty and a nearby window open.

Their natural concern was calmed one year by this Radiology report in his medical record:

When the films were reviewed it soon became clear

Why Santa Claus had arrived here.

The bones of the chest, my God what a dandy,

Are entirely composed of peppermint candy.

The lung fields reveal a definite suggestion

Of seasonal happiness and party congestion.

The musical rales, it's easy to tell, Are due to an enlarged, heart-shaped Christmas bell.

Our final impression is one of good cheer

And a guarantee that Santa will be back next year.



Dropping by the MGH for a checkup has become an annual tradition for Santa.



MGH *News*

Vol. 38 No. 1

MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS

January-February, 1979

Guarding Babies Against a Danger of "Crib Death"

Are Some Medical Advances Being Abused?

Calculators, color television, microwave cooking. . .

Technology has come a long way in these United States to make life as comfortable as possible for people.

But for one segment of the population, those who minister to the sick, technology is posing a dilemma which defies easy solution.

Medical science has advanced so rapidly in the past decade that the application of new technology is outpacing the ability of health-care budgets to withstand the cost.

Health professionals argue that many new and expensive procedures are often overused and, at times, should not be employed at all.

Few would question the cost of life support measures, for example, when the slightest chance exists that the patient will rally. But for others for whom all hope has passed, the question arises, "Where do we draw the line in seeking to extend life by artificial means?"

In a recent issue of *Hospitals* magazine, Dr. Charles A. Sanders, MGH General Director, wrote:

"Approximately 15 percent of the patients in most tertiary [teaching] hospitals will consume 40 to 50 percent of the resources applied to patient care. Obviously triaging [categorizing] the hopelessly ill patient at the earliest possible stage can result in a significant reallocation of resources to those patients with a better chance to survive and live a productive and meaningful life."

Dr. Sanders, at the same time,

stressed the hazards of developing any system which would establish rigid treatment protocols for various diseases.

"There are situations where family and physician do not agree as to the proper course of therapy," he wrote, and he further emphasized, "there are rare patients who recover despite apparently insuperable odds."

In the 1960s and early 1970s, resources which could be devoted to the improvement of health care were virtually unlimited. The cost reimbursement system set up by government and private insurers for hospitals and health-care

(Continued on Page 2)



Ellenjean Devine of East Boston, who suffers prolonged breathing pauses in her sleep, naps during an MGH visit, guarded by a heart monitor, while her father and mother meet with other parents of children with similar problems.

"Darcy seemed perfectly well during the first two months of her life, and then one night, about a half hour after I had put her to bed, I went into her room and found her cold. Her skin was very white, and her eyes were rolling. She did not appear to be breathing. I picked her up and shook her vigorously for what seemed like the longest time until, at last, she regained consciousness."

The experience related by Mrs. Gregory Blanchard of Boston concerned the younger of her two daughters, and the event, two years ago, was not to be an isolated occurrence.

Following that night of great anxiety to Gregory and Sharon Blanchard, Darcy stopped breathing many times in her sleep, initially as often as five times a night, but the episodes no longer created terror.

A special device provided by the MGH Children's Respiratory Laboratory monitored Darcy's breathing and sounded an alarm whenever a crisis developed. Only a firm shaking was necessary to trigger a resumption of respiration.

As time has passed, the crises have become fewer and fewer, but each night when Darcy is tucked into bed her mother still puts around the child's chest the electrode belt which would relay any sign of distress to the monitor nearby.

Darcy's halt in breathing is known as sleep apnea. Occurring normally among many babies, apnea usually lasts less than 15 seconds and causes no harm. Unlike other children, however, Darcy does not automatically snap out of an apneic spell. She needs assistance. No

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EDITORIAL:

The Cults and Justice Holmes

In its depraved ending Jonestown has awakened the country to a potential danger that few knew existed. Until the macabre events that horrified the world, not many persons ever heard of the People's Temple. The same can be said about the anonymity of a number of cults. Other such groups that have been featured by the news media, and thus have become better known, have usually been depicted as offbeat rather than dangerous phenomena.

Only a very small segment of society has shown concern. Among the most anxious are relatives who "lost" a family member to one of the organizations. Also considerably interested have been psychiatrists, sociologists, anthropologists, and the like, who have been studying the most recent burgeoning of cults. A subsegment of the scientists regards most of these religious organizations as potentially dangerous elements harboring the seeds of destruction or of self-immolation.

One of the students of the current crop of cults is Dr. John G. Clark, Jr., whose views are outlined in a Page 4 article. In most of what he states about the recruitment and conversion of members to these groups, Dr. Clark places himself in the mainstream of scientists studying the situation. In his belief that these organizations are virtually all dangerous, he veers off into the scientific subsegment.

If Dr. Clark proves correct, he presents this nation with a dilemma. Most cults arise from or with a religious point of view. To prosecute religions for their beliefs violates the principle inherent in the First Amendment to the Constitution. To provide complete freedom, on the other hand, might jeopardize the safety of many Americans.

One possible solution might be a test once applied by the late Oliver Wendell Holmes. Faced with a case involving the classic confrontation between freedom of speech and danger to public safety, the former Supreme Court Justice said the key element is whether a citizen's action constitutes a clear and present danger.

Having cited a guideline, one still has to apply it in a prudent, judicious manner. Therein lie the true horns of the dilemma. Striking the delicate balance without eroding the First Amendment will require a Solomon—if the most dire viewpoint about cults proves correct.

Advances in Medicine Can Often Escalate Hospital Budgets

(Continued from Page 1)

professionals promoted the development and adoption of technology at a rapid pace.

Today, however, governmental emphasis throughout the nation's economy is focused on conserving resources and finding more effective ways to use what is on hand.

Because of its explosive growth in capability and cost, health-care providers, perhaps more than in any other field, are feeling pressure to control expenses more judiciously.

Medical technology, despite its benefits to patients, has contributed substantially to the rapid escalation of hospital budgets. In fact, studies show that technological impact caused as much as 38 percent of the increase in adjusted daily hospital costs in 1976.

Cost inflation can be attributed to many factors, one technology spawning another, for instance. The heart-lung machine facilitated the surgical repair of heart valves and congenital heart defects. This work, in turn, fostered the development of artificial valves and the "coronary artery bypass graft," as well as special intensive care units with

Letter to the Editor

Dear Editor:

The article on autopsies in your current issue (November, 1978) was very interesting. It is something I have thought of for a long time.

I'm surprised you don't explain how a person goes about making arrangements for this procedure.

My husband and I contribute a small amount of money annually to MGH—we have made MGH the principal beneficiary in our wills—and now we wish to arrange for autopsies.

Dorothy Field, RN
Cummaquid, Mass.

(Editor's Note: You are right. We should have included instructions. Anyone wishing to make provisions for an autopsy should write a letter to the hospital where he is cared for asking that upon death his body be autopsied and that the letter be included as a permanent part of the medical record.)

systems designed to ensure the patient's responsiveness to treatment.

To the economy minded, technologies such as these are being increasingly questioned.

"In the times we live in," said Dr. Sanders, who is also a cardiologist, "the primary question to ask of bypass graft technology, as well as any other, is whether or not it does what it says it will do, in this case relieve angina pectoris.

"No one disputes its success in achieving this goal. While there is little to suggest that the longevity of patients undergoing operation has increased, it is clear that the quality of the patient's life has improved which is no small accomplishment."

Diagnostic technology has often led to increased cost simply because of the mounting sophistication of instruments.

A notable example is the computed tomography (CT) scanner, a noninvasive device which X rays cross-sectional "slices" of the brain or body in searching for suspected disease.

Often more accurate than invasive, risky, and more expensive procedures, the CT scanner nevertheless has been criticized as a technology which does not materially improve the outcome of the patient.

Dr. Sanders said critics overlook the obvious fact that the purpose of the scanner is solely diagnostic and that it does precisely what it is supposed to do. "To expect accurate diagnosis alone to affect patient outcome," he said, "is a simplistic and unfair test of the technology itself."

To determine how best to apply the recent technological advances of medi-



Several specialties may be involved in the treatment of a single patient in any of the MGH intensive care units.

cine to patient care, the MGH in July, 1977, established a Medical Practices Evaluation Unit. The Milbank Memorial Fund of New York awarded a \$660,236 grant to cover the unit's expenses for the first three years of its operation.

Directed by Dr. George E. Thibault, a cardiologist, the unit has been studying all patients admitted to the Medical Service's 18-bed Intensive Care Unit (I.C.U.) to determine how their treatment has affected the duration and quality of their lives.

It is hoped that analysis of the data will lead to medical criteria predicting the probability of benefit from the use of intensive care and associated technology.

A system of classifying critically ill patients and a special committee to advise on treatment of the hopelessly ill also have been set up at the MGH

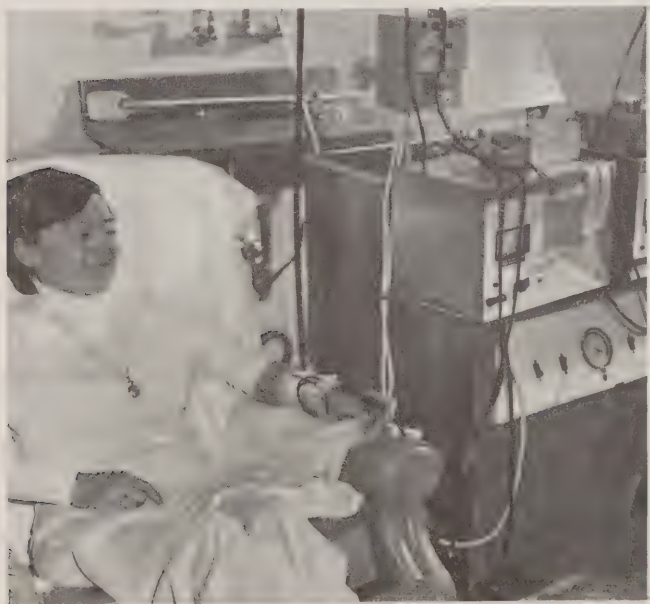
following studies conducted by the hospital's Critical Care Committee, headed by the Chief of the Respiratory I.C.U.

The panel consists of specialists in various medical and surgical fields as well as the Director of the Department of Nursing, a patient-care representative, a nun nurse, a priest psychiatrist, a lawyer, and other members of the MGH administration.

The advisory group that was established, the Optimum Care Committee, is consulted when difficulties arise in deciding the appropriateness of continuing intensive treatment for a patient. Although an I.C.U. director may suggest a committee study, the formal request must come from the responsible physician, and the latter may accept or reject the group's proposed course.

"The medical profession has a long and notable history of addressing difficult problems; our society expects the profession to do so," said Dr. Sanders, an Associate Professor of Medicine at Harvard Medical School.

"With their active involvement I feel confident that the industry and the regulator can devise reasonable resource allocation guidelines that will ensure a standard of care of which the country will be justly proud, for which it will willingly allocate the necessary economic support, and which will allow all types of diseases to be treated comprehensively, effectively, and humanely. . ."



Dialysis treatments to remove impurities from the blood are a lifesaving procedure for patients with malfunctioning kidneys.

Photographs: Pages 1, 7, 8, Myron Daniels; p. 3, MGH Photo Lab; p. 4, 5 (right), United Press International; p. 5 (left), 6 (lower), Wide World Photos; p. 6 (upper), Dale Wickberg.

Jonestown's Horror Stirs a New Look At Cult Practices

It will be regarded in the annals of mankind as one of the most bizarre, yet strangely fascinating, acts of self-destruction.

What began as a dream of a love-filled paradise deep in the rain forests of Guyana disintegrated into a wild scene of almost unimaginable carnage for more than 900 disciples of the Rev. Jim Jones.

As readers and viewers recoiled at each new detail of the slaughter of California Cong. Leo Ryan and his group and the subsequent suicide-murder of the more than 900 Jonestown settlers, questions began to arise about the cult scene in general.

What are cults, and are they dangerous? Who joins them and why? Who are their leaders, and how can they so easily possess people's minds? Can Jonestown happen again?

Puzzled by what has been a relatively unpublicized phenomenon, the nation's media turned to people like Dr. John G. Clark, Jr., a Consultant in Psychiatry at the MGH, who has studied the movement for the past five years.

As a result of his expertise, which evolved from such techniques as in-depth interviews with more than 60 cult and former cult members, the Harvard Medical School faculty member has written journal articles warning of their danger, has appeared before a Vermont state senate panel looking into their activities, has served with government agencies in Germany and Great Britain, and has testified in court in regard to their recruiting and conversion practices.

"The cult scene at the time preceding the Guyana incident was very unstable," he said, "and, because of problems among other groups in recent months, I thought the prospect for violence was very great. But I never imagined this in particular."

Dr. Clark said the word "cults" has been used to describe groups as small as Charles Manson's band of drug-driven followers to as large as Hitler's Nazi party; as good-willed as the early followers of the People's Temple, and as dangerous as most people regard the Ku Klux Klan.

"I think it is technically correct now to describe a cult as a small group sur-



Wearing a gas mask, a Guyana Government representative surveys some of the hundreds of bodies found at the People's Temple settlement run by cult leader Jim Jones.

rounding a relatively limited set of ideas or being controlled by a single person," Dr. Clark said. "The members are unusually devoted to their leader, separated from society, and determined to maintain that separation."

Dr. Clark classifies the prospective cult members into three categories: the "seekers," the "adapters," and those who join to legitimize or hide deviant behavior.

"These three types represent almost everyone in America at some time during his or her life," he said, "so you can see the wealth that these groups can choose from."

In analyzing each category, Dr. Clark said the "seekers" comprise a much more troubled population than the others.

"Their past histories show considerable evidence of developmental and emotional problems during much of their lives," he explained. "They are trying to restore themselves to some semblance of comfort in a fresh, though false, reality. Many may have tried drugs, other cults, and mind-control courses but were unsuccessful."

The second category, usually younger and from more affluent backgrounds than the "seekers," embraces those people who "adapt" into the cult as a result of their own emotional state, the desire to be attached to something meaningful, and the smooth-talking techniques used by cult recruiters.

"This type of prospect," Dr. Clark

said, "usually appears to be a normal, satisfactorily developing young person who has become depressed and frightened, as such people will, on beginning a true separation from his family."

Classically the disenchanted college-aged youth, these "adapters" are usually recruited by a cult member of the opposite sex in places where their confusion or dismay appears evident, such as a bus station or social hangout. With the invitation of food, shelter, and a place to share mutually held ideas, the prospect "often easily collapses or 'adapts' into the cult's philosophy as a great relief from former discomfort," Dr. Clark explained.

"The third category appears to be of a delinquent or sociopathic personality who sees in cult membership opportunities to legitimize deviant behavior under the cover of religion."

The percentage of this type of prospect would be very small, he said, and may actually not appear in some cults. "But," he stated, "some of these may be leaders and thus responsible for the sadistic and demeaning practices of some individual cults."

Whoever they are or whatever their reasons for joining, most of the prospects are then exposed to the same basic method of conversion described by Dr. Clark: First, the cult recruiter exploits the prospect's weakness and wins his confidence to the point where the prospect enters the group's domain. Then, a steady barrage of pressure,

including sleep deprivation, rhetoric, and chant, is generally used in a step Dr. Clark refers to as "coercive persuasion."

In this process, the prospect is brought into an almost trancelike "state of narrowed attention," which Dr. Clark said may take anywhere from a few hours to several months to achieve.

Next, the cult leaders then indoctrinate the prospect into the controlled environment where his individuality and ties with his former existence are stripped away, and the process of thought and attitude reform is done through an intensified barrage of preaching, peer pressure from other converts, and regular exhaustive physical endeavors.

From this step, acculturation, or the maintenance of conversion, would bond the convert's devotion to the cult. Such actions as the signing of suicide pacts by members of the People's Temple is often done in this phase. In fact, some cults ritualize this phase by having members sign written contracts, Dr. Clark said.

"The member would now recover from the acute changes visible throughout the early stages of conversion," he said. "These could actually be in the person's physical appearance or in the occasional lack of mental alertness. The member would now appear like a fairly reasonable person, but the differences are there. The synthesis of the personality is complete."

Once converted, the cult member, now stripped of his individuality and initiative to question, is left at the mercy of the leader and thereby sacrifices control of his life and, in the case of Jones's followers, his death.

"The People's Temple group was not unique in its espousal of ritualistic mass suicide," Dr. Clark said. "Many cults, including the large and well-known ones, have ordered their members to 'kill or be killed if the faith is wavering.' Some have even rehearsed similar mass suicides, although the People's Temple has been the only one to carry it out."

It is because of the blind devotion to the founder, as exemplified at Jonestown, that many experts turned their probes to the leaders.

"To generalize," Dr. Clark said, "the leaders tend to start out as talented, psychopathic—in the old fashioned use of the word—individuals who may have had some kind of special experience themselves of dissociation . . . [which may lead them] to claim special magical powers and responsibilities."

They also tend to be demonstrably wealthy, he continued, and often entertain unique world views, a monomaniacal concentration and wish for power. They frequently encourage followers to consider them prophets or messiahs but may or may not believe all of their own doctrines.

"But above all else," Dr. Clark emphasized, "they have a great talent for influencing others."

It is because of this concentration of power, and the inability of the membership to question it, as well as the resulting deleterious effects on its physical and mental health, that Dr. Clark considers many cults, some of them quite well known, to be "destructive" and "dangerous" to their members and society at large.

"These particular types of cults do not allow people to be free enough to make their own choices, to develop personally," he said. The highly manipulated state which members are brought into "is the beginning of mental slavery" that causes members to lose their ability to deal with the outside world and its "multiple reality."

"If something goes wrong," he warned, "they can become beasts."

Even if a member were to leave the group, Dr. Clark said, his adjustment to society would be questionable because of his experience.

"An individual with even moderate prior psychological disability is likely to be set back considerably, perhaps even permanently in his or her maturation to adulthood," he said, "and will certainly be impaired in the ability and capacity to deal with the real world's opportunities and dangers. The loss of educational and occupational experiences will confirm these losses beyond all doubt."

In the young field of cult study, others

(Concluded on Page 6)



Cults may be as small in size as Charles Manson's band of followers or as large as Adolf Hitler's Nazi party.



A gentle movement of the hand on the back often can restimulate a baby's respiration during prolonged apnea.

End of Crib Peril Varies With Each Child

(Continued from Page 1)

one knows for sure what makes her different from other youngsters.

Her alarm sounds when her breathing stops for longer than 20 seconds. Someone must always be able to reach her within the next 10 seconds, ready to provide stimulation.

A registered nurse who served in a major Boston hospital for five years, Mrs. Blanchard has had experience in resuscitating people, but she said that "when you are dealing with your own child, it is a completely different situation."

The monitor and a comprehensive

support program additionally provided by the MGH help the Blanchards to cope with their problem. Their older daughter, Lisa, 3, is normal.

Apnea is believed to be one of the major causes of what is vaguely referred to as the "Sudden Infant Death Syndrome" (S.I.D.S.) which claims the lives of as many as 10,000 seemingly healthy babies each year.

Generally stricken before four months of age, they succumb in their cribs without any sound, gasps for breath, or struggle. An autopsy fails to offer any clues to the cause of death.

"Ninety percent of the babies who develop prolonged apnea and are managed with a monitor will pass the critical stage by 10 months of age," said Dr. Daniel C. Shannon, Director of Pulmonary Research in the MGH Children's Service. "But we do have patients who have been on monitors for as long as four years."

Since the MGH began its home monitoring program in 1973, some 260 babies have been enrolled. During the first three years, four infants died, one because of an airway obstruction and the others because their parents did not hear the initial sounds of the alarm. Due to the deaths, the equipment and support system have since undergone changes.

"We have not had any deaths in the past two years," said Dr. Shannon, "even though in that period we have cared for three times as many babies as we treated during the earlier phase of the program."

Approximately 160 children are no longer being monitored. They appear to have outgrown their problem. In general they are normal, healthy youngsters.

Dr. Dorothy H. Kelly, Medical Director of the Home Monitoring Program, said at an MGH Pediatric Grand Rounds that during their second year of life some children exhibited a delay in motor development, probably reflecting diminished muscle tone (hypotonia) noticed during their first year. These difficulties disappeared by two years of age. No other abnormalities were seen.

"When an infant is referred to us for

Cults

(Concluded from Page 5)

disagree with Dr. Clark's conclusion that most cults are dangerous. Some believe that the People's Temple self-destructed solely because of its complete reliance and dependence on one leader.

From this catastrophe, one argument goes, a lesson has been drawn up that potential recruits to other cults would do well to learn.

Dr. Clark, however, worries about the continued susceptibility, particularly of the young, to the powerful recruitment techniques employed.

"Jonestown is a lesson that should be well learned," he said, echoing an almost universal sentiment. "But I honestly doubt it will."



The sign and the hooded figure draw attention to a Ku Klux Klan recruitment rally held on a meadow in north-central Louisiana.

treatment of sleep apnea," Dr. Kelly said, "we first determine whether there already has been a diagnosis attributing the condition to one of a number of known causes of apnea, such as heart-beat irregularities or pneumonia.

"If a particular abnormality is reported, we check it out and treat it. If no specific problem is evident, we then evaluate the child's ability to breathe properly."

A large number of the monitored children are categorized as "near miss" infants. On at least one occasion during sleep before entering the program, they had been found apneic, limp, pale or with bluish skin tone (cyanosis), and in need of either mouth-to-mouth resuscitation or vigorous stimulation to resume breathing. While on monitors, 60 percent of this group suffered significant additional episodes.

Other monitored children at risk originally responded to gentle stimulation, but during the next few months, while being monitored, even some of these babies had spells that called for vigorous shaking.

(Gentle shaking simply means putting a hand on the back of the prostrate baby and rocking the child slightly. For vigorous stimulation, the hand, held in the same position, would literally shake the baby back and forth in its crib.)

The Respiratory Laboratory employs two types of alarm systems. One protects against a prolonged breathing halt and the second against a drop in heart

Monitoring Workshop Draws Wide Interest

National attention has focused on the MGH's Home Monitoring Program for babies in danger of dying during sleep from extended halts in breathing.

The MGH and the National Sudden Infant Death Syndrome Foundation last month sponsored a three-day seminar at the hospital to discuss all aspects of the program.

In addition to Foundation delegates and an official of the United States Department of Health, Education, and Welfare, the workshop attracted physicians, nurses, and social workers from nearly a dozen states.

A medical representative of a children's clinic in Strasbourg, France, also attended.



Mr. and Mrs. Kenneth Devine, whose daughter is pictured on Page 1, confer with Mrs. Anne Barr, Northeast Regional Director of the S.I.D.S. Foundation, at an MGH gathering of parents of monitored children.

rate. A newly introduced model now will guard against both dangers.

Because parental failure to hear alarms had resulted earlier in the deaths of three infants, the new monitor was designed with a more audible, 70-decibel warning signal, and the older models were also adjusted to provide the louder warning.

Alarms from each device are sounded not only at cribside but also over intercom or remote units placed in another part of the home where a parent might spend considerable time.

At least once a month the baby's breathing patterns and heart rate are recorded at home during a night sleep and later transcribed onto another device in the Respiratory Laboratory for study by Dr. Kelly and her associates.

When an infant is judged in need of a monitor, the parents must attend a concentrated teaching program at the MGH before the equipment can be installed. Extending over as many as four days, the program includes morning, afternoon, and even evening sessions.

The parents learn what apnea is and how long an affected child may have the problem. Discussions follow on the home care equipment and precise procedures for reviving a baby after an alarm signals danger.

"We instruct the parents that if they do not detect any change in the infant's skin color, they should wait 10 seconds to see if the child resumes breathing on its own," said Dr. Kelly, an Instructor in Pediatrics at Harvard Medical School.

"If the spell does not terminate spontaneously, we ask the parents to shake

the baby gently. Vigorous stimulation would follow, if necessary, and finally the parents would resort to mouth-to-mouth resuscitation if the baby still had not begun to breathe."

Dr. Kelly emphasized that if the parents notice a skin color change immediately upon answering an alarm, they should not hesitate to apply stimulation.

"Initially in the program the parents tend to do a lot more shaking than they have to," she said, "but during the first week or so we're able by telephone to calm the mother and father and persuade them to go through the graded steps that we prescribed.

"Of all the resuscitative episodes that have been reported in the homes, only one did not seem appropriate. So, in general, the parents seem to carry out instructions quite well."

To assist parents in understanding what monitoring is like, the MGH Television Department has produced a 15-minute motion picture which offers a broad view of the program. The film not only corrects many misapprehensions among parents but also describes changes they can anticipate in their lifestyle.

In addition to having to be within 10 seconds of cribside while the baby is asleep, the parent is cautioned, for example, against engaging in any excessively noisy housework, such as running a vacuum cleaner, or any other activity which might drown out an alarm.

The motion picture has been shown at many medical centers and at medical

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Baby Monitoring Includes Full Backup Aid

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conferences, as well as to parent groups at the MGH.

Usually, a baby will experience more episodes of apnea during its first month on a monitor than any other time. Parents exhibit their greatest anxiety during the first week, then gradually learn to adjust. In most instances a marked drop-off in apnea occurs when the baby is between 5 and 6 months of age.

Miss Barbara Zenn, Supervisor of Children's Social Service at the MGH, said that when home monitoring is recommended, a social worker meets with the parents to evaluate their strengths and how they cope with the stress created by their baby's condition.

She said the social worker will offer to arrange any needed services, such as counseling or supportive home care.

Installation of a home monitor is accompanied by the around-the-clock

availability of a pediatrician, nurse, technician, and monitor repairman.

Personnel in Dr. Kelly's laboratory initiate daily telephone contacts with the family to ensure that all is going well. Although these contacts decrease in frequency, a Visiting Nurse calls at the home regularly to make a personal check of how the baby is progressing and to inquire about any new needs.

Sometimes, at the parents' request, the nurse may demonstrate resuscitation procedures to the family, as well as friends and neighbors, so that they can relieve the parents in the home.

"Parents with children on monitors also have formed an association," said Dr. Kelly. "The members call on each other to share their feelings and provide mutual assistance."

"The association has regional chapters in Massachusetts, Connecticut, Rhode Island, and New Hampshire. In

addition to periodic chapter meetings, the association's full membership is invited to sessions four times a year at the MGH."

Mothers of apnea babies originally hand-fashioned the electrode belts which are part of the monitoring apparatus. Dr. Kelly has since devised a belt that will be mass produced.

Medicaid, Blue Cross-Blue Shield, and other insuring parties pay benefits in Massachusetts for the monitoring of infants with apnea or an abnormally slow heartbeat, provided the program is being carefully supervised.

Critics of apnea home monitoring claim that the equipment can seriously disrupt family life and that expensive long-term hospitalization of the baby is more advisable.

In response, Dr. Kelly cites an as yet unpublished study conducted by the MGH and a team from the Simmons College School of Social Work. Directed by Lillian Cain, Ph.D., of both Simmons and MGH Social Service, the investigation shows that for most parents the monitoring program, described last April in the professional journal *Pediatrics*, relieves, rather than provokes, anxiety.

Dr. Shannon, an Associate Professor of Pediatrics at Harvard Medical School, described the monitors as "not perfect but quite reliable when properly used."

"For prolonged apnea that is potentially life-threatening, there is only one form of treatment," he said, "and that is stimulation or mouth-to-mouth resuscitation by parents who have been alerted by the alarm from a monitor. By doing further research studies, we hope to discover the neurochemical basis of apnea and from that knowledge develop sound pharmacologic [drug] treatment. I think that this is a likely possibility during the next five years, but in the meantime we must rely on electronic devices and well-trained, fully supported parents."



Dr. Dorothy H. Kelly, Medical Director of the MGH Home Monitoring Program, discusses the program at a workshop attended by representatives of many medical centers.



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March, 1979

Developing the Potential of Cerebral Palsy Patients

Bones Provide Unique Clues to Identity

Several years ago the dismembered body of a man was found in a marsh in Boston's Dorchester section. Missing both hands, the head, and the right leg, the body, which bore a gunshot wound, presented police with a seemingly impossible task of identification.

Without hands, there were no fingerprints to check. Without a head, dental comparisons were out. But identification was made, and two men ultimately went to prison for the murder.

Dr. Leonard Atkins, an Associate Medical Examiner for Suffolk County as well as an MGH pathologist, detected a poorly defined tattoo on the victim's left arm.

A survey of police files disclosed that a man who had a tattoo on the same arm was presumably shot in Dorchester three months earlier and had subsequently vanished.

Further investigation by Dr. Atkins revealed that twice within the previous 10 months the individual had undergone X-ray tests at Boston City Hospital. Doctors examined his spine because of back pain and later had X rays taken of his right shoulder.

Dr. Atkins, also an Associate Professor of Pathology at Harvard Medical School, obtained the films, ordered X rays taken of the spine and right shoulder of the torso, then called on a radiologist to compare the old and new films. He confirmed that they were all of the same man.

The successful prosecution for murder that followed was believed the first in which the identification of unknown human remains by X ray was accepted as legal evidence.

Writing recently in the *Journal of the American Medical Association*, Drs. Atkins and Majic S. Potsaid, who is Coordinator of Ambulatory Radiology at the MGH, cited evidence supporting bone X rays as an identification tool.

"Many parts of the human skeleton can serve as bony prints for the identification of human remains," they wrote, "and in certain respects bones have a uniqueness similar to that of fingerprints."

Dr. Potsaid, who is also Director of Education in the MGH Radiology De-

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When 8-year-old Chris Bell of Plymouth first came to the MGH, he could neither sit nor stand. Instead, he lay on his back, rigid as a steel girder, unable even to roll over.

An injury to motor centers in Chris's brain prevented coordination and control of the muscles in his arms and legs.

Suffering one of the more severe forms of cerebral palsy (C.P.), Chris was given what an MGH doctor described as "maximum treatments to produce maximum potential." After four years, the rewards are self-evident.

A series of operations to loosen tightened muscles combined with extensive physical and occupational therapy have put Chris on his feet.

With the help of braces and a pediatric walker, the youngster is able to propel himself about on his legs. Meantime, he attends public school and keeps up with his third-grade classmates. Among them is his twin brother, Stephen, who is physically normal.

As with many cerebral palsy patients, Chris has a speech disorder which can sometimes mask his intellectual capacity. He has proven to be very bright both in school and at his therapy sessions.

Dr. Michael G. Ehrlich, MGH Chief of Pediatric Orthopaedic Surgery who operated on Chris, recalled a young medical resident who had C.P. and yet became a skilled surgeon.

"The illness affected his career in only one respect," said Dr. Ehrlich. "Instead of operating with his right hand, which he would have done normally, he learned to use his left hand."

Dr. Ehrlich said that across the nation there are many people with cerebral



During an MGH visit for physical therapy, cerebral palsy patient Chris Bell takes a walk accompanied by his therapist, Mrs. Pamela Vecchione.

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AN ANALYSIS

Chad Green: A Continuing Dilemma

The following article, completed on deadline early in February, is written to provide in perspective information about a subject that has not always been objectively reported. [EDITOR'S NOTE.]

The matter of Chad Green, 3-year-old leukemia patient, (*MGH News*, May 1978) keeps taking new and unexpected turns.

In Massachusetts Superior Court this January his parents brought suit against the Commonwealth of Massachusetts to permit them to substitute the controversial substance laetrile for court-ordered chemotherapy (drug treatment). Chad had been free of signs of leukemia since March, 1978, four weeks after court-ordered chemotherapy began.

Later in January, 1979, the parents defied the court and brought the child to a Mexican border-town laetrile clinic.

The clinic is operated by Dr. Ernesto Contreras, who in January testified for the Greens in Superior Court. Dr. Contreras had surprised observers by admitting on the witness stand that it would be unethical to take Chad off the chemotherapy that had put his leukemia in remission and made him an active, healthy, happy-looking boy. The laetrile advocate said that only chemotherapy works on childhood leukemia.

Under cross-examination Dr. Contreras, a pathologist, admitted he had never heard of either null cells or T cells, an important distinction in the treatment of acute lymphocytic leukemia, Chad's type. When asked by Asst. Atty. General Jonathan Brant if he was aware of Leukemia Group B, Dr. Contreras said there are two types of leukemia, acute and chronic, and Chad has the "B" type. (Actually, Leukemia Group B is an international med-

ical group well-known for its role in the turning of acute lymphocytic leukemia, the most common childhood form, from a death sentence into a disease that is apparently "curable" in about 67 percent of afflicted children.)

Another laetrile advocate who testified for the Greens in the Superior Court action they brought against the state was Dr. Bruce Halstead of California. Dr. Halstead testified that the Greens should take Chad to him rather than Dr. Contreras because the latter uses poor quality laetrile. Dr. Contreras had admitted under cross-examination by the assistant attorney general that he holds interest in the factory which manufactures the laetrile used on patients treated at his clinic and that he had been convicted of smuggling laetrile.

Newspaper accounts had referred to Dr. Contreras as Harvard educated. Actually, neither Harvard University nor Harvard Medical School has any record of his ever attending. He did, however, train in pathology at the Farber (Jimmy Fund) Center in Boston. Dr. Emil Frei, who heads the center, was one of a number of witnesses for the state who testified against using laetrile, and in favor of chemotherapy. Another of these was Dr. Victor Herbert of Downstate Medical Center in New York City who told the court that Chad has low-grade cyanide poisoning from the laetrile given him by his parents. Dr. Herbert said the poisoning was the same as used by the People's Temple members in Guyana to commit suicide. Since Chad is getting comparatively small amounts, he said the potential side effects would take a couple of years or so to occur but could include blindness and neurological problems.

After the Superior Court trial, Judge

Guy Volterra issued an interim decision ordering the Greens to stop giving Chad laetrile, to continue chemotherapy, and to have him regularly monitored for laetrile cyanide poisoning and for overdose of vitamin A which witnesses had testified he was suffering from as a result of large doses given him by his parents.

By taking Chad to the Mexican clinic, the Greens violated the court order. Judge Volterra then placed the Greens in civil contempt but gave them until Feb. 7 to comply without being subject to penalty. The Greens failed to appear in court.

Several weeks before the Superior Court case brought by the Greens against the state, Judge Volterra had dismissed Chad's former physician, Dr. John T. Truman, MGH Chief of Pediatric Hematology, as a codefendant with the state.

Two important reasons for the dismissal were: 1. Dr. Truman was originally forced to bring the matter to court last February because of a new state law. 2. Under the original Superior Court decision ordering continuance of chemotherapy, the Greens were free to take Chad to any board-certified hematologist but chose Dr. Truman.

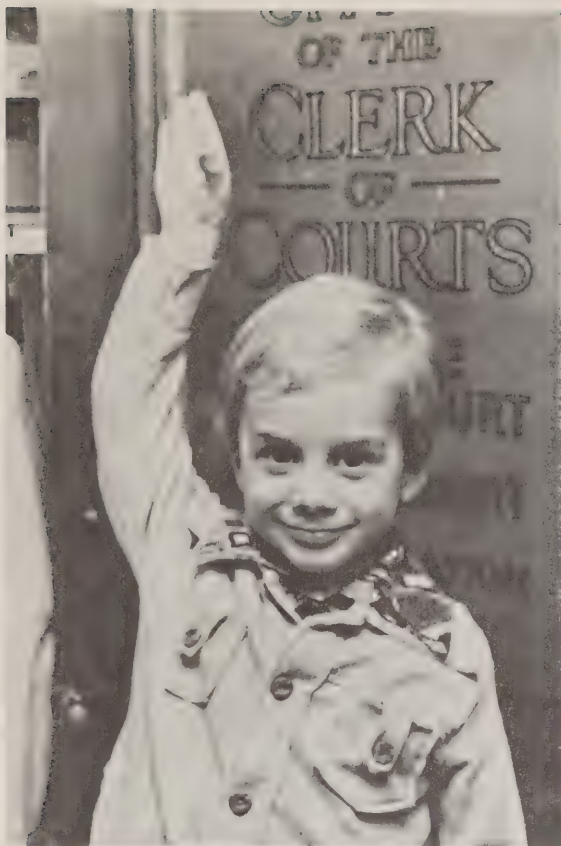
In fleeing to Mexico, the Greens said they were seeking freedom.

The hospital issued the following statement: "Our original role was to follow state law in bringing the matter to court last February [1978]. Since then the state has assumed full legal jurisdiction, and the MGH has been selected by the parents until now to carry out the court-ordered chemotherapy.

"The fact that Chad has had 11 months of effective treatment and has shown no detectable sign of leukemia is hopeful. However, the normal course of treatment to bring about apparent cures is a minimum of three years. Dr. Truman said that to stop competently administered chemotherapy now would drastically lower Chad's nearly 50 percent chance for an apparent cure. If there are any undetectable leukemia cells still present, Chad will ultimately relapse without adequately administered chemotherapy.

"Everyone here caring for Chad has grown extremely fond of him and very happy with his progress.

"We sympathize with the Greens but plead with them not to severely reduce Chad's good opportunity for a healthy, normal, leukemia-free life."



Three-year-old Chad Green waves to photographers at Superior Court in Plymouth, Mass.

Chad's Chronology

Because of its complexities, the Green case is at best confusing. Here in summary form is a chronology:

August, 1977: An Omaha, Nebraska, medical center diagnoses the most common type of childhood leukemia in 1-year-old Chad. Chemotherapy begins.

September, 1977: Chad's parents leave Nebraska because they object to the radiotherapy that the Omaha hospital uses in conjunction with chemotherapy (drug treatment). Parents choose Dr. Truman at MGH to administer chemotherapy without radiotherapy. Chad is already "in remission" showing no detectable sign of leukemia.

September-November, 1977: Dr. Truman; his assistant, Dr. Martin T. Fosburg; and Chad's primary-care nurse, Genevieve V. Foley, explain many times to the Greens the medications, the entire treatment planned, etc. To allay concerns, they also introduce the Greens to two patients who had once been sick with Chad's type of leukemia and to their parents who explain their own children's experiences.

November, 1977: Chad is in maintenance phase of treatment: a monthly

injection plus pills given by parents at home. Side effects are few, minimal, and brief.

November 19, 1977: The Greens remove Chad from home chemotherapy without informing Dr. Truman. They place the child on "nutritional therapy."

December, 1977; January, 1978: On regular monthly visit Greens tell Dr. Truman Chad is having no problem taking his pills. Ask for refill.

February, 1978: Greens return with Chad who has a "bad cold." Dr. Truman determines Chad has had a severe relapse of his leukemia. Greens ultimately admit Chad has been off chemotherapy and on their "nutritional therapy" since November. Over a four-day period the Greens reject chemotherapy. Confronted with a new law that states that only the courts can decide whether a minor can be taken off lifesaving treatment, Dr. Truman complies and brings the case to court. Court reinstates chemotherapy. Intensive phase of treatment is reinitiated because child was off medication for three months.

February-March, 1978: After two lower courts decline to hear the case un-

der the new law, the matter goes to Superior Court.

March, 1978: Under court-ordered chemotherapy Chad's leukemia again goes into remission with no sign of leukemia cells.

April, 1978: Superior Court Judge Guy Volterra orders Greens to continue chemotherapy but gives them a choice of any board-certified pediatric hematologist. They choose Dr. Truman.

July, 1978: Greens lose an appeal to Supreme Judicial Court of Massachusetts. In its unanimous decision, court also notes that original court (probate) erred in failing to hear the case under new Massachusetts law.

September, 1978: Greens lose an appeal in Federal District Court.

September, 1978: Greens admit they have been giving laetrile since April.

December, 1978: Superior Court dismisses Dr. Truman as codefendant with state.

January, 1979: Superior Court reopens case at request of Greens who state that laetrile should be substituted for chemotherapy. Greens' witnesses fail to support that contention but say that laetrile should be used to *supplement* chemotherapy. Judge decides chemotherapy should be continued and laetrile stopped on the grounds that it is slowly poisoning Chad with cyanide. Greens flee to Mexican border-town laetrile clinic.

January 31, 1979: Judge holds Greens in civil contempt but gives them until February 7 to return and comply to avoid sentencing. New York laboratory findings about cyanide level in Chad "concern" the only Green witness who had tried to rebut contention of low-grade cyanide poisoning.

February, 1979: Greens remain at laetrile clinic beyond Feb. 7 deadline. Reports vary on whether Chad's chemotherapy is being appropriately maintained.

Photographs: Pages 1, 5 (lower), 6, 7, 8, Myron Daniels; p. 3, courtesy of Boston Herald American; p. 4, courtesy of Dr. Majic S. Pot-said; p. 5 (upper), courtesy of JAMA, Nov. 17, 1978, Vol. 240, pp. 2307-2308, Copyright 1978, American Medical Association.



X ray of hand clearly shows distinctive patterns created by "struts" which give bones much of their strength. Bone marked by arrows is shown enlarged at right.



Bone Patterns Differ in Each Individual

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partment, explained that bones contain so-called trabecular patterns (struts of bone) which give the skeleton much of its strength.

"These struts create specific patterns," he said. "Since each individual's growth, physical build, and stresses on bones are somewhat different, each person's trabecular patterns must also differ."

Bones do not become static at maturity; they are metabolically active with a great deal of bone mineral (e.g. calcium and phosphorus) passing into and out of the skeleton, bone turnover as it is called. Nonetheless, trabecular patterns still retain much of their distinctiveness.

The general configurations of bony structures, such as the skull, also are unique. Dr. Potsaid described the nasal sinuses as excellent markers to be used for comparison purposes since "everyone's sinuses are at least a little different, and X-ray studies can show subtle differences."

It was just that kind of marker which Drs. Atkins and Potsaid used to identify the remains of a 20-year-old man who drowned in Boston Harbor off Deer Island after a boat capsized on April 30, 1977.

In their Journal article, Drs. Atkins and Potsaid mentioned a study some years ago by another investigator who noted 13 points of identity in the sinuses, as well as seven in the right mastoid, a bone situated behind the ear.

"He indicated that the number of points of identity could be extended indefinitely," they wrote, "and that this type of comparison could also be applied to the other bones of the body."

Moreover, the size of certain skeletal bones, such as the pelvis, can provide a clue to sex. Additionally, since in general men toil harder physically than women, the bones of males tend often to degenerate faster.

Commenting on earlier stages of life, Dr. Potsaid said that judging the age of a growing individual is not particularly difficult.

An Associate Professor of Radiology at Harvard Medical School, Dr. Potsaid explained that "the ends of bones have epiphyses [growth plates]. They remain open while the bones lengthen and widen; then they close. We have tables that indicate at what age any of the numerous epiphyses usually shut down."

Diseases of bone leave characteristic signs. During advancing years arthritis frequently causes increased degeneration. Paget's disease, which enlarges

bone and causes it to become more dense (and readily seen on X ray), can be an excellent marker. In addition, millions of older Americans suffer a mineral loss which can lead to osteoporosis. Fractures of the hip and wrist are typical consequences of this latter condition because it leaves the bones thin, porous, and weaker.

Whatever the cause, fractures never heal so perfectly that evidence of the breaks is totally erased. They provide ideal points of reference for identification purposes.

The number of X rays taken in the United States annually totals in the hundreds of millions, with dental X rays high on the list. When a body has become so decomposed or mutilated that fingerprint identification is impossible, investigators next commonly turn their attention to the teeth of the victim.

The use of dental X rays to identify people dates to the origin of the technology itself, but even before then, for hundreds, conceivably thousands, of years teeth were recognized as a personal trait which distinguished one individual from another.

"No two teeth are exactly the same," said Dr. Edward B. Seldin, an MGH oral surgeon. "Each has its own unique anatomy and specificity of form for each of its six surfaces: the front, back, two sides, the biting surface, and the root."

"When you consider, in addition, that any combination of 32 teeth in a mouth may be missing, or may have fillings of various kinds, or may have had root canal work, or may be replaced by false teeth, you begin to realize that the number of distinguishing features in a set of teeth is truly astonishing."

A little more than 10 years ago, 32 people were killed, most burned beyond recognition, when an airplane smashed into a hillside at Lebanon, N.H. Only eight victims could be identified through fingerprints, but, furnished with dental records, Dr. Seldin was able to provide positive identification of 14 other persons (*MGH News*, December 1968).

Sometimes the mineral content in teeth can assist in identifying human remains by providing a clue to where a victim lived. A high level of fluoride or other agent in teeth or bone, for example, might indicate that the person resided in an area where the substance was abundant in the water supply or

from other sources.

Dr. Seldin, an Assistant Professor of Oral Surgery at Harvard Dental School, added that the effects of medication can also be important.

"Tetracycline, for instance, is known to stain teeth," he said. "When a person uses the drug chronically, perhaps for the treatment of acne, the roots of his teeth develop a very characteristic color."

During a person's formative years, metabolic disturbances such as a high temperature caused by rheumatic or scarlet fever would very likely affect the growth pattern of the teeth.

"Such changes would be readily noticeable in the enamel," said Dr. Seldin, a graduate of Harvard Medical School as well as Harvard Dental.

"The disturbances would indicate that at a particular age in his development the individual may have had a certain health condition which could be confirmed by medical records."

Gathering a wealth of physical data on an unknown human would be completely unrewarding without the availability of records of known individuals for comparison.

"There is an acute need in this country for a central agency to maintain files on missing persons," said Gordon Parry, who serves in the Boston area's Suffolk County Medical Examiner's office as Chief Clerk for the Northern District.



The death of a 20-year-old man whose boat overturned in Boston Harbor was confirmed when an X ray (left) taken of the victim's skull after a motor vehicle accident was compared with an X ray (right) of a skull found washed ashore. The configuration of the frontal sinus (see arrows) in the two films was identical.

"At present, someone could be reported missing in another county, be found dead in Boston, only a few miles from his home town, and still go unidentified for days."

Mr. Parry said his office receives an average of five telephone calls a week from people searching for others. Very often these lead to identification.

If someone boarded an airplane in California, flew to Boston, and then fell dead in the street without any identifying papers on him, the chance of

authorities learning his name and address might depend entirely on whether he had ever been fingerprinted.

"Since the military draft ended, fingerprinting has fallen off tremendously," said Mr. Parry.

"Five years ago we identified almost every body that came through our department. Now, however, we find the number of unknowns to be increasing annually. A 'missing persons' bureau, operating on a national scale, would seem to be the ideal solution."

Cerebral Palsy

(Continued from Page 1)

palsy who have been mislabeled as mentally retarded. "It is just unfortunate," he said, "that they have not been properly assessed and given the benefit of the skills available today to treat them."

Mental retardation is one factor

sometimes associated with cerebral palsy, but C.P. is not a single disorder. The term is simply a label used to describe a variety of crippling conditions caused by damage to portions of the brain that control the muscular or motor system.

The damage may produce involuntary muscular movements, tremors, rigidity, speech and hearing impairments, and mental retardation, but not necessarily all of these conditions.

Additionally, the affliction may be so mild that the person involved may not even know he has the illness. He may drop something and say, "Well, I'm a little clumsy." Or, after physical exertion, he may excuse himself with "I'm not a very good athlete."

Of every 1,000 live births in this country, six babies are found to have C.P. It may be attributed to such fac-



Occupational Therapist Kristine Legler guides Chris Bell in a typing exercise designed to improve the cerebral palsy patient's eye-hand coordination.

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Cerebral Palsy Patients Need Team Care

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tors as premature birth, a mother's abnormally prolonged labor, an unusual position of the fetus in the womb, bleeding within the skull (intracranial hemorrhage), or a lack of sufficient oxygen at the time of the birth.

In terms of movement, 65 percent of C.P. infants become spastic; that is, certain muscles become tight and fail to perform in concert with other muscles.

A spastic hamstring tendon, for example, will bend a knee, but there may not be sufficient power in another muscle to straighten the knee.

Of those patients who are spastic, only one in every five is affected in all limbs.

Dr. Ira T. Lott, an MGH neurologist and pediatrician, said that the motor system of a newborn is so immature at birth that signs of motor dysfunctions may not appear until the child is a year old, or even older.

Care of the C.P. patient, he said, reflects a true team strategy. The skills of pediatricians, neurologists, surgeons, nurses, physical and occupational therapists, speech pathologists, psychologists, social workers, and educators are pooled to benefit the child.

When Mrs. James Bell brings her son, Chris, to the MGH, the purpose may be to keep an appointment with Dr. Ehrlich; Dr. Paul H. Chapman, a pediatric neurosurgeon; Mrs. Pamela Vecchione, a physical therapist; or Mrs. Kristine Legler, an occupational therapist.

"When I see Chris, I work on his sitting balance, general muscle strength, and ambulation," said Mrs. Vecchione. "There is a wide variety of exercises to relax muscles that may be too tight. Sitting, standing, and walking should not be activities one has to think about. With relaxation techniques and exercises to improve strength and motor control, these activities can become second nature."

In occupational therapy, Mrs. Legler instructs Chris in eye-hand coordination tasks such as writing and typing. A game of tether ball additionally allows him to practice trunk balance. Learning to dress is also a part of his therapy.

Although C.P. does not by itself narrow one's life span, serious secondary complications may develop.

Dr. Lott, who is also an Assistant Professor of Neurology at Harvard Medical School, said the complications

could ensue from malnutrition, swallowing difficulties, being bedridden for long periods, or from a lateral curvature of the spine (scoliosis) which could impair breathing.

At the Community Evaluation and Rehabilitation Center (C.E.R.C.) of the Eunice Kennedy Shriver Institute in Waltham, Mass., a technique has been devised to assist wheelchair-confined C.P. patients who have spinal deformities.



Using an ophthalmoscope, Dr. Kalpathy S. Krishnamoorthy, a pediatrician and neurologist, examines the eyes of an infant in the MGH Newborn Intensive Care Unit for possible signs of a neurological impairment that could signal cerebral palsy.

Dr. Lott, Director of the Clinical Research Unit, said technicians at C.E.R.C. fashion a mold outlining the uneven contour of the patient's spine. This mold then serves as a seating support for the individual in his wheelchair.

"Thanks to this modular seating," said Dr. Lott, "a number of very severely afflicted cerebral palsy patients have become much more functional in their ability to move about."

Being functional is crucial to the victim of C.P. During school age, his care is usually well directed. Later, he sometimes becomes lost to follow-up.

"After leaving school, some patients simply have nothing to do," said Miss Betty Kozlowski, Assistant Chief of the MGH Rehabilitation Unit on the ninth floor of the White Building. "They either do not participate in programs that keep them active, or they are unable to find employment."

Miss Kozlowski's unit cares for a

number of adult C.P. patients whose inactivity has led to a debilitating gain in weight and/or loss of endurance or muscle strength. Many, once ambulatory, are back in wheelchairs, and they find this reversal difficult to accept.

"The people we see are the more severely affected ones who tend to have involvement in all extremities," Miss Kozlowski said. "We design special programs for each individual."

The principal goal is to restore the patient to a healthy level of daily activity. This may mean an exercise program at home to augment one's accustomed daily habits.

"We try to arrange for a continuation of services after the patient leaves," Miss Kozlowski added. "If he lives within a reasonable distance of the MGH, he will be referred to the MGH Rehabilitation Clinic for follow-up. Otherwise he will be referred to some agency in his own community. The point is he should not be allowed to go downhill again."

To maximize the C.P. patient's participation in society, communication is essential. "There are very few patients whose communications skills cannot be treated," said Miss Julie Wheelden, Director of the MGH's Speech-Language Pathology Unit.

Frequently, communication problems are not related to deficient vocabulary or grammar, but to intelligibility. With emphasis in treatment on the need for overarticulation, rate reduction, and phrasing, the speech pattern can be improved.

Even though muscle weakness may affect the intelligibility of one's speech, many programs can be prescribed to bring about improvement.

Miss Wheelden told of a young woman, we'll call her Nancy, who was raised in another state. Having cerebral palsy combined with a profound hearing loss, she was thought to be severely retarded.

As a result of the incorrect diagnosis, Nancy did not receive any formal education until the age of 17. A sister, dissatisfied with Nancy's progress, brought her to the MGH for evaluation.

"At first, she communicated with gestures and some consonant-vowel combinations," said Miss Wheelden. "She demonstrated little control over her tongue, lips, and jaw. She babbled. Her verbal skills were at the 2-3 year level!"

Clinicians in the Speech-Language Pathology Unit were struck, however,

Should Dying Patients Be Told the Truth?

A 17-year-old youth, hospitalized with cancer, complained of severe pain. Narcotics, administered in increasingly heavy doses, failed to provide expected relief. Perplexed, the attending physician finally wondered:

"Is the pain the real problem? Perhaps he's trying to tell us something with his pain."

The youth had not been informed that he had one of the less curable types of cancer. His family felt the truth would be too much for him to bear.

In an informal talk with the teenager, a psychiatric consultant found, however, that the patient strongly sensed he was very ill. He was agonizing over the unknown, imagining the worst.

On the advice of the psychiatrist, the family, in a tearful scene, disclosed the diagnosis to the youth. Not only did

the honesty bring the relatives and patient closer together but it also reduced his need for a pain-killing medication.

In addition to being an expression of tissue damage, the pain was a signal of emotional trauma.

"It is imperative that we tell the patient the truth," said Dr. Thomas P. Hackett, Chief of Psychiatry at the MGH. "You establish a frank exchange that is necessary for optimum patient care."

Dr. Hackett cited a Scandinavian study of 200 people afflicted with varying types of solid cancers. The patients were divided into two groups of 100 each. Doctors gave the members of one group detailed information about their condition. The physicians treating the others were tight-lipped.

To the surprise of most observers, the patients who were dealt with openly

registered far fewer symptomatic complaints and had fewer adverse side effects from medication.

Being honest with a patient in danger of dying is not a novel approach. Early in this century most physicians endorsed the philosophy of straightforwardness. This changed, however, as modern technology produced new, more sophisticated treatments.

During the early 1950s, a nationwide survey of physicians showed that about 90 percent preferred to tell dying patients little or nothing about the diagnosis.

Much more recently, a similar survey revealed a sharp reversal. Well over half of the physicians who participated believed in being completely candid with patients.

Many who hedge might state, "Well, I'll tell him if he asks me." The fact

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by Nancy's appropriate behavior whenever she succeeded at a minor task and her evident motivation to learn. A hearing aid was obtained. She was treated at the MGH twice weekly until she could be placed in a specialized school setting with a daily rehabilitative program.

Today, Nancy has an "expressive vocabulary" of nearly 200 basic words using a combination of a communication board, gestures, and vocalizations. Employing this method, she is able to communicate in three-word phrases.

"With help in school, at home, and in our unit, Nancy will one day become a functional communicator," said Miss Wheelden. "Despite her multiple handicaps, she will learn to express her basic needs."

While much attention is focused on the care of C.P. patients, behind-the-scenes research should not be overlooked.

In the MGH's Newborn Intensive Care Unit, follow-up studies are being conducted under the direction of Dr. Kalpathy S. Krishnamoorthy on infants born with neurological and other problems to see how the babies develop and to determine what factors are associated with their difficulties. Many of these children are at high risk for C.P.

Meantime, in the MGH's Movement Disorders Clinic a search is being pressed for effective medication.

"We don't have very good medicine yet for many people with cerebral palsy," said Dr. Robert R. Young, an

MGH neurologist who directs the clinic.

In treating some patients, it often is a matter of trying out drugs until one proves helpful. Haloperidol has been prescribed at times to curb slow, writhing movements in a limb. Lioresal helps some people with spastic legs, but not others. Propranolol might be called for if the patient, because of nervousness, tends to shake more when in public.

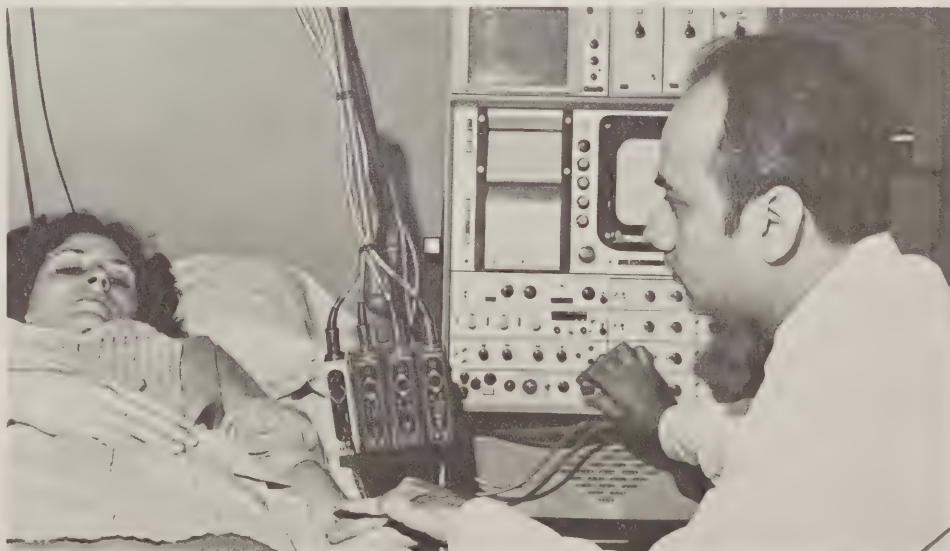
Studies have been conducted on the possible effectiveness of L-Dopa in treating cerebral palsy, but Dr. Young, who is also an Associate Professor of Neurology at Harvard Medical School, said C.P. patients do not usually have damage to that part of the brain for

which L-Dopa might be helpful.

"The drugs you use depend entirely on which part of the brain happens to have been injured," he emphasized. "As time goes by, I'm sure the overall drug picture will improve."

Although much remains to be learned about C.P., the incidence of the disorder surprisingly is on the decline. The reasons: greater proficiency in both prenatal and obstetrical care.

Even if C.P. could not be eliminated, the reduction of its severity would be a tremendous advance. Many people with mild cerebral palsy are able to marry, raise families, and live normal lives.



In the MGH Clinical Neurophysiology Unit, Dr. Bhagwan T. Shahani and Mrs. Jane Harrison, a Research Technician, demonstrate how an electromyograph would be used to analyze a cerebral palsy patient's voluntary and reflex muscular activity.

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The Dying Often Fear Loss of Identity

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is dying patients don't often demand an explanation of their illness from their doctor.

"Maybe a part of them really doesn't want to know," said Dr. Hackett, "or maybe they're afraid of embarrassing the doctor. Many physicians find it difficult when they're asked to disclose an illness that may be fatal.

"Over the last 10 to 15 years, however, those of us who have worked with dying patients have found that there are very few who truly prefer to avoid learning the reality of their condition."

Dr. Hackett, a Professor of Psychiatry at Harvard Medical School, emphasized that *how* a patient is told is more important than *how much*.

"The truth must be followed immediately with assurance that the physician intends to stand by the patient and do everything possible for him," Dr. Hackett explained. "The diagnosis must not be equated with immediate death."

Many of Dr. Hackett's studies on the dying patient were carried out in collaboration with another MGH psychiatrist, Dr. Avery D. Weisman, who is also a Professor of Psychiatry at Harvard Medical School.

Dr. Weisman and J. William Worden, Ph.D., an MGH psychologist, are Co-Principal Investigators of Project Omega (*MGH News*, June-August 1970), an MGH program of research into both terminal illness and suicide. Dr. Weisman has written five books, including *On Dying and Denying*, and well over 25 papers on the subject.

He said that when a dying patient learns the extent of his illness his natural reaction of weeping frequently causes those who told him the truth to feel guilty of inflicting harm.

"Actually, this is a healthy cry," Dr. Weisman pointed out. "Getting the

tears out early can be regarded as a measure of relief rather than anguish."

Dr. Weisman's motto is, "Candor With Hope," not hope for a cure but for maintaining one's identity as a worthwhile person and for controlling more severe symptoms.

"Sickness and self-worth go together," he said. "A very sick individual has an image of being impaired. He's unable to do the things that most people do to sustain their sense of pride.

"When he knows that he has a chronic, gradually debilitating disease and is declining, he looks for comfort rather than cure and support rather than restoration to the way he once was."

Dr. Hackett listed four major symptoms that come under the physician's care in his treatment of the dying patient: pain, nausea, labored breathing (dyspnea), and loneliness.

Pain and nausea can be controlled with a wide range of drugs. Proper positioning, making sure the airways

are not blocked, and teaching methods of relaxing can ease breathing problems. "Loneliness might be regarded as the most important symptom," Dr. Hackett remarked. "Certainly it is the most treatable."

He said that doctors and nurses should spend at least as much time with the dying patient as they do with patients who are treatable. They should recruit members of other hospital services—the social worker, the psychologist, the chaplain—to help assuage the patient's loneliness. Above all, relatives should be encouraged to visit regularly.

Dr. Hackett stressed that "simply sitting and listening is a valuable method of treatment. Just the presence of someone in the room is important. The patient must be made to feel that he is not an outcast."

While the patient is the chief concern of the physician, the health of the bereaved must not be overlooked. After a loved one has died, close relatives enter a very fragile period when, studies verify, they often become more susceptible to a variety of illnesses.

According to Dr. Weisman, one of the most common fallacies about the dying patient is that "the closer he comes to death, the more intense becomes his fear of dying.

"I think the fear of dying may be more acute at the time of diagnosis rather than later," Dr. Weisman commented. "No one wants to die when he's well, but when he's very, very sick and very, very uncomfortable, and the future seems to hold no promise, he can accept death. In death, remember, there is no pain."

Dr. Weisman recalled the words of Jonathan Swift, the 18th century English writer and dean of St. Patrick's Cathedral in Dublin:

"It is impossible that anything so natural, so necessary, and so universal as death, should ever have been designed by providence as an evil to mankind."



The dying patient often needs frequent visitors to avoid feelings of loneliness.



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Healthful Living Spurs Recovery of Injured Athlete

Parasites Can Inhabit the Body for Years

Working in the Emergency Ward of a major teaching hospital, medical residents may think after a while that they have "seen everything." Often, they soon learn they have not.

One night a few years ago, a 26-year-old Boston factory worker walked into the Emergency Ward at the MGH after a visit to the adjoining Massachusetts Eye and Ear Infirmary.

"I've got Loa loa," he said. "They told me to come here for treatment."

Two days after developing a burning sensation in his left eye, the young man had sought help at the Infirmary, and doctors quickly spotted the cause of the trouble.

Coiled in full view under the pained eye's protective outer membrane (the conjunctiva) was a Loa loa worm. Uncoiled after removal, it measured fully two inches in length.

The worm, known technically as a form of nematode, is found in areas of West Africa. The patient grew up in Nigeria and visited numerous countries in Africa but had resided in Boston for 15 months prior to his hospital visit.

Even as he was making repeated trips to the MGH to deliver specimens for evaluation by the hospital's Parasitology Laboratory, he developed a burning pain in his other eye. Doctors at the Infirmary soon relieved him of a second worm.

Although the patient had been away from Africa for more than a year, the infestation in his body had spread unnoticed until his eyes began to hurt. A natural tendency of the Loa loa worm to gravitate toward light led to discovery

of the ailment.

Armed with the Parasitology Laboratory's detailed findings on the patient's condition, physicians at the MGH were able to prescribe effective treatment.

Mrs. Barbara Parkhurst, the laboratory's Chief Technician for the past nine years, said Loa loa is rarely encountered in the United States. Some patients are known to have been infected for up to five years before symptoms appeared.

"You can spot the adult worm," she said, "but it takes laboratory testing to detect the microfilaria, the prelarval stage of the disease in the blood of man and the tissues of the parasite carrier."

(Continued on Page 2)

Ever since his boyhood when he sat for hours watching hawks soar over New Hampshire's White Mountains, Brooks Dodge had yearned to experience the exhilaration of free flight.

Born and raised in Pinkham Notch at the base of majestic Mount Washington, he learned to ski at an early age and later earned places on the United States Olympic ski teams of 1952 and 1956 as well as the World Championship ski teams of 1950 and 1954.

But his interest in soaring never waned, and ten years ago, at the age of 39, he realized his goal of piloting a sailplane, or glider. Amassing more than 500 hours of flight, Mr. Dodge felt confident that if trouble ever developed he could find some place in the mountains to land safely.

Soaring over flat terrain presented other perils, however. Last July 10th, a miscalculation led to an accident that critically injured Mr. Dodge.

While nearing the end of a 140-mile glider race that began and was to end at the Sterling, Mass., airport, he found that his 15-meter (49-foot wingspan) fiberglass sailplane had descended too low. Sighting a field that seemed appropriate for a landing, he was about to put down when he suddenly blacked out. The plane hit a tree and spiraled to the ground.

For 78 days, Mr. Dodge lay in a bed at the MGH while specialists in orthopedics, neurosurgery, plastic surgery, cardiology, and ophthalmology, as well as a battery of nurses and therapists, fought to restore his health.

They succeeded, and, without exception, all said they had been inspired by

(Continued on Page 4)



Photo of Brooks Dodge taken at Cortina, Italy, when he participated in 1956 Winter Olympic Games.



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AN EDITORIAL:

John Hilton Knowles

John Hilton Knowles (*MGH News*, October 1971) was an electric personality who charged everyone he touched. He motivated and inspired some, cajoled and prodded others. Most who knew him were devoted to him. There were also those who disliked or envied him, but few were apathetic.

He directed the MGH through an era when medicine was changing, when government regulations were beginning to encroach. With a cutting edge that reached the very marrow, he fought against changes he considered unfair and used as a tool those he thought could prove helpful. For the era of medicine he strode through, his style seemed just right. Witness the leaps taken by this hospital during the 10 years he directed it. In his seven years at The Rockefeller Foundation, he often extolled the MGH and continued to challenge the conventional. From his new platform he emphasized the benefits of preventive medicine.

Dr. Knowles loved life. His hearty laugh punctuated sentences, and his sense of humor lightened the dark moments. In his nasal tones, his animated voice pealed through the din of any group even as he dominated any gathering. He played as hard as he worked. Whether he was crushing a squash ball, slamming a golf ball, or caressing the keys of a piano, he acted with the passion of a man with an inner drive. At work his voice fired orders with the rapidity of a machine gun, and he expected prompt action. In short, he was a vibrant man whose every pore exuded strength and vitality. He was the indomitable being.

That is why his illness and death at age 52 so stunned those who loved him. From the moment in January when his insidious cancer was discovered until the end in March, the disease wasted his body and sapped his strength. Yet even when only the shell seemed to remain, the spirit stood uncrushed. He greeted each visitor to the hospital room by cheerfully calling the friend's name.

Dr. Knowles knew and acknowledged with a finger pointing upward that he was being summoned. Yet he fought the inevitable on the chance in a million that a miracle might happen. At the same time the realist in him planned his own memorial service. He wanted a celebration of his life rather than a mourning of his death. By virtue of his dynamism, his whole life was a celebration. Through his achievements he lives yet, and this tiny planet is the better for his having been here.

Growing Travel Rate Heightened the Need To Study Parasites

(Continued from Page 1)

The Parasitology Laboratory at the MGH was established a decade ago in recognition of a need for specific expertise in diagnosing and treating parasitic disorders.

The return of American servicemen from Vietnam, the rotation home of members of groups such as the Peace Corps, and an increased population of travelers under the care of MGH physicians contributed to the decision to set up the laboratory as a division of the hospital's Infectious Disease Unit.

A graduate of Simmons College with a degree in biology and medical technology, Mrs. Parkhurst received training in parasitology from her lab's physician-founder, Dr. Gordon T. Moore. He, in turn, had studied at the Harvard School of Public Health and at the federal Center for Disease Control in Atlanta, Ga.

Dr. Moore is now Acting Medical Director of the Harvard Community Health Plan.

A parasite is defined as any organism that feeds and grows on or in a different organism while contributing nothing to the survival of the host. Some parasites cause no harm to the host while others inflict serious damage.

Many one-celled animals (protozoa), for example, are parasites. In this group, one type of amoeba may live in human intestines, feeding on partly digested food, and cause no obvious illness. Another form of amoeba, however, produces amoebic dysentery (amebiasis), marked by inflammation of the intestines.

Last summer, a business executive flew halfway around the world to be treated at the MGH for an illness that turned out to be an amoebic liver abscess.

While working in Indonesia, he developed a fever, then began to cough up quantities of blood-stained sputum.

The condition persisted for six weeks, the fever at times reaching 104° F. The

Photographs: Pages 1, 4 (upper), courtesy of Brooks Dodge; pp. 3 (upper), 5, 6, 7, 8, Myron Daniels; p. 3 (lower), Barbara Parkhurst; p. 4 (lower), Dr. Bertram Zarins.



Mrs. Barbara Parkhurst, Chief Technician in the MGH Parasitology Laboratory, studies a specimen of what may be a parasitic disorder.

patient also was stricken with chest and abdominal pains, chills, night sweating, lethargy, and loss of appetite.

Taken first to a physician in Singapore, the man was given what was termed "intensive antituberculous therapy." Seeing no improvement, his employer, a Boston-based firm, decided to seek MGH help.

Proper diagnosis was followed by drug treatment that produced marked improvement within 48 hours.

Of more than 1,600 tests performed annually in the MGH Parasitology Laboratory, the most common are those for a protozoan-caused, intestinal disease called giardiasis.

"We see a lot of this disorder because it does not originate in any particular area of the world," Mrs. Parkhurst stated. "People returning from Mexico; from Russia, especially Leningrad; and from the Colorado ski areas of Vail and Aspen have been treated for the disease which spreads by means of infected food or water. Epidemics have broken out in the state of Washington."

Often patients suffering intermittent diarrhea from the malady will put off seeking treatment until they realize after a week or two that the illness is more than just a minor upset.

Also belying the widespread notion

that all parasitic diseases are endemic to warm climates is another protozoan-related illness called toxoplasmosis.

Found throughout the world, the parasite named *Toxoplasma gondii* affects an estimated 30-to-50 percent of all adult Americans at some time during their lives.

Toxoplasmosis usually runs a mild course and causes no harm. When symptoms appear, they may resemble infectious mononucleosis.

The disorder can occasionally be dangerous, however. It can lead to retinitis, an inflammation of the retina of the eye, and sometimes when pregnant women contract the ailment, it may severely affect the unborn child. Congenital defects such as eye and brain damage occur.

In addition to protozoa, parasites include a wide variety of worms, such as tapeworms, roundworms, pinworms, and flukes. Most enter the body as a result of the ingestion of contaminated food. One form of roundworm, called ascaris, can grow within the body to a length of six inches.

Although many patients with intestinal worms are perfectly healthy, in others symptoms may include abdominal pain, vomiting, irregular bowel movements, loss of appetite, severe anemia, headache, and mental depression.

As noted previously, symptoms of worm disease may not appear until long after the infestation begins.

In some cases, the infection may be transmitted through the skin by means of insect bites. *Loa loa* (loiasis), for example, is borne by the mangrove fly.

Insects are the "intermediate hosts" of a plethora of diseases. The tsetse fly transmits African sleeping sickness.

One type of mosquito spreads malaria.

Mrs. Parkhurst describes falciparum malaria as perhaps the most dangerous disease encountered by her laboratory.

A few years ago, the MGH admitted a 27-year-old Italian seaman who was suffering from this potentially fatal illness.

The patient, who weighed more than 275 pounds, had felt good until four days prior to admission. Then, he suddenly was stricken with fever, nausea, vomiting, and abdominal pains, and he finally sought help in the MGH Emergency Ward.

The patient told doctors his ship's most recent ports of call had been in Nigeria and Ghana.

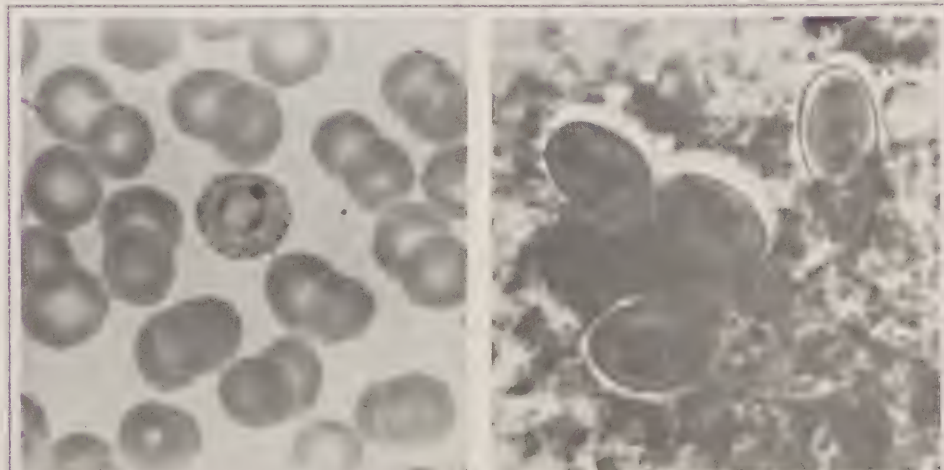
He responded well to treatment, and when he had recovered sufficiently, he returned to his home in Sicily.

Stool examinations often provide all the evidence needed to verify the presence of a specific disorder, but the Parasitology Laboratory may also have to examine blood, tissue, saliva, or urine, or perform diagnostic skin tests.

For a number of years the Center for Disease Control, an agency of the United States Public Health Service, included the MGH lab among a select dozen. Their performance set a standard by which the agency could grade the proficiency of hundreds of other laboratories.

A rotation policy terminated that MGH role, but the hospital facility still fulfills such a function for the state of Pennsylvania.

Since its inception, the Parasitology Laboratory has trained some 50 Fellows or Pathology Residents in the specialty. Some have gone on to establish similar testing and research centers elsewhere.



Microscopic views of two parasitic diseases. At left, *Plasmodium vivax* malaria, the most common form of malaria, and, at right, giardiasis, an intestinal disorder frequently encountered by the Parasitology Lab.



Brooks Dodge shown competing in the 1956 Olympic Men's Slalom Race at Cortina, Italy. He placed fourth.

Star Skier Blames Heat for Glider Crash

(Continued from Page 1)

the perseverance of the patient. Despite multiple injuries that included a threatened loss of his left leg, his steadfast will to recover and the fact that he had always kept himself in superb physical condition helped carry him through his crisis.

He later attributed his aerial blackout to heatstroke. Another pilot in the race reported that the temperature in his own cockpit had reached 120° Fahrenheit.

Mr. Dodge had a bottle of water, but he said it had fallen out of reach behind his seat.

"Where I grew up in Pinkham Notch, I didn't have to develop any great capacity to withstand heat," he said. "The temperature there rises above 80 degrees only two or three times a year, and then the limit may be 82 or 83 degrees."

Mr. Dodge initially was taken to a hospital in central Massachusetts. Coincidentally, his wife, Ann, was at the MGH undergoing a postoperative check of a shoulder problem when word of her husband's accident reached her.

Mrs. Dodge persuaded Dr. Carter R. Rowe, her orthopedic surgeon, to consult with the doctors attending her husband and to try to arrange his transfer to the MGH.

At first fearful that he might not survive the trip, the doctors later agreed with Dr. Rowe that the over-the-road journey was worth the risk.

Shortly before 8 p.m., less than four hours after the crash, an ambulance carrying Mr. Dodge pulled up to the entrance of the MGH Emergency Ward. A medical team arranged by Dr. Rowe was waiting. Headed by Dr. Bertram Zarins, another MGH orthopedic surgeon, the team worked on the unconscious patient most of the night.

He had suffered bone fractures in his face, head, spine, and both legs, as well as loss of vision in his right eye and a bruising (contusion) of his brain.

"Initially, most of our attention was



Due to extensive loss of bone, Mr. Dodge's left leg was stabilized by this unusual-looking device called a "Hoffman apparatus."

concentrated on his left leg," said Dr. Zarins. "He had not only suffered a severely comminuted [crushing] fracture of both the tibia and fibula [the two principal bones of the leg], but some of the bone had also been lost through an open wound."

The bone loss, coupled with circulatory difficulties and the open wound, prevented use of the customary plaster cast. Instead, the doctors stabilized the leg with an external skeletal fixation device called a "Hoffman apparatus."

Somewhat resembling an erector set, the device involved inserting pins through the leg above and below the break. Rods running parallel to the leg were then connected to the ends of the upper and lower pins.

With the leg thus immobilized, the medical team was still able to observe the circulation in the limb and to treat the damaged soft tissues.

After preliminary care, the still unconscious patient was transferred to the MGH's Neurosurgical Intensive Care Unit.

Dr. Robert G. Ojemann, Associate Director of the Neurosurgical Service, quickly checked the results of a CT (computed tomography) X-ray scan performed at the hospital from which Mr. Dodge had been transferred.

"The scan had shown evidence of a contusion of the right frontal area of the brain," Dr. Ojemann said, "but no evidence of any blood clot in the head or of any displacement of the brain. There was no paralysis.

"From our standpoint, no surgery was indicated. Mr. Dodge was given medication to reduce swelling in the brain, and we kept him under observation for any delayed signs of injury."

In the meantime, Dr. James T. Patten, an MGH consulting ophthalmologist, was summoned from the neighboring Massachusetts Eye and Ear Infirmary to examine the patient's injured right eye.

"Blood entering the eye from a large hemorrhage around it had reduced his vision to only light perception," said Dr. Patten. "The pupil had also become paralyzed because of the shock of the accident.

"We began immediate treatment with drugs to stop the bleeding which otherwise might have caused such complications as cataracts or glaucoma."

The medication helped the body to reabsorb the blood and, slowly, the vision returned to normal. Dr. Patten said the eye will have to be protected

from intense rays of the sun but should cause no problem.

Ten days after arriving at the MGH, Mr. Dodge was awake, fairly lucid, and in sufficiently stable condition to undergo plastic surgery.

Dr. John P. Remensnyder, Chief of the MGH's Division of Plastic Surgery, repaired severe bone fractures around the right eye and also placed a skin graft on the patient's injured left leg.

Prior to the operation, as a precautionary measure, a pacemaker was connected to Mr. Dodge's heart to regulate its beat.

Dr. Allan L. Friedlich, an MGH cardiologist, recommended the pacemaker because Mr. Dodge's pulse rate was unduly low, in the 40s.

"A low pulse rate might very well have been normal for him since he was a highly trained athlete," Dr. Friedlich said, "but inasmuch as he was facing surgery, we wanted to be sure that his heart would not slow too much."

Fractures in the right leg, spine, and temporal bone of the skull did not require surgery, but the problem of how to mend the shattered bone in the left leg remained.

As specialists were contemplating this operation, a complication arose that was to make the surgery an even more delicate undertaking.

Dr. Friedlich related that while preparing to go on vacation in August he stopped by Mr. Dodge's room in the Phillips House to say good-bye, and Mrs. Dodge—whom the doctor termed a very reliable observer—remarked that her husband had suffered a minor chest pain. Additionally, while getting up for a chest X ray, he felt faint.

Dr. Friedlich suspected a pulmonary embolism, a sudden blockage of a blood vessel in the lung by a floating blood clot. He set in motion a series of tests—a radionuclide lung scan, a repeat computed tomography scan, and a pulmonary arteriogram—which confirmed his suspicion. All of the tests were accomplished in the space of two hours after 6 p.m. at the start of a weekend.

The clot had apparently formed in the damaged left leg. Heparin, an anti-coagulant, cleared up the potentially life-threatening embolism, but there existed an ever present danger that the drug might precipitate bleeding in the patient's bruised brain, causing a stroke. No such bleeding occurred.

Two months after his plane crash, Mr. Dodge underwent a bone graft on



Dr. Bertram Zarins, MGH orthopedic surgeon, finds rapid improvement in patient's brace-supported leg during postdischarge checkup.

his left leg, the procedure made even more hazardous by the patient's continued need for a blood-thinning agent.

Using bone from the patient's pelvis, the surgical team, including Drs. Zarins and Rowe, replaced a four-inch-long section of lost bone just above the ankle.

"It was a major task," said Dr. Rowe. "There was a real question as to whether we would be successful with the bone graft, but happily we were."

"The Hoffman apparatus, developed several years ago, was a big help. We've had other types of skeletal fixation devices in the past, but I think the Hoffman apparatus is the best."

Mr. Dodge left the hospital on September 26th, but he continued to wear the Hoffman support for another month.

Maintaining Spirits Aided Dodge Care

A hospital can be a lonely place.

When one is sick or injured, in pain or otherwise uncomfortable, away from loved ones and familiar surroundings, physical care often does not suffice.

Former Olympic skier Brooks Dodge, who spent 78 days at the MGH recovering from critical injuries suffered in a glider crash, explained:

"I think that healing to a great extent depends on one's mental attitude, and that attitude is shaped by the people who surround the patient."

On the third floor of the MGH's Phillips House, a framed collage of

A series of plaster casts followed, and then in early February—seven months after the accident—his leg was fitted for a removable plastic brace.

Wearing the brace, Mr. Dodge is able to move about without crutches and tend to his duties as a real estate development consultant.

"He takes off the apparatus to exercise the leg and regain strength in the extremity, but it's too soon for him to try to walk on it unaided," said Dr. Zarins, who is an Instructor in Orthopedics at Harvard Medical School.

"In time he'll be able to walk normally, but he may feel some pain or stiffness in his left ankle when he runs. That's because the leg fracture caused some damage in the ankle joint."

The injury should not prevent the graduate of Dartmouth College and Harvard Business School from hiking again along the many trails which his late father, Joseph (Joe) Dodge, supervised for more than 30 years as manager of the Appalachian Mountain Club headquarters in Pinkham Notch.

As for skiing, Dr. Zarins sees no reason why the one-time skiing ace cannot resume the sport when he fully recovers.

Mr. Dodge already has his sights on "helicopter skiing." A helicopter ferries skiers to remote snow-covered mountains, enabling the party to negotiate slopes never skied before.

Asked if that might not be dangerous, the 6-foot, 1-inch tall Granite Stater, still in Olympic form at 173 pounds, admitted:

"Well, I suppose you can get hurt if you're not careful."

photographs hangs on a wall directly across from the nursing station. The pictures show many of the doctors, nurses, technicians, and other hospital personnel who figured in Mr. Dodge's recovery.

The collection of informal shots snapped by the patient's wife, Ann, and assembled by the two of them represents a "thank you" for what they call the "total care" he received at the MGH.

"The people who looked after me concerned themselves not only with repairing my body but also with restoring my spirits," Mr. Dodge remarked. "When I left Phillips 3, it was almost like leaving a family."

(Concluded on Page 6)



The nursing station on the third floor of the Phillips House is usually a beehive of activity.

Staff Hails Supportiveness of Mrs. Dodge

(Concluded from Page 5)

He said the hospital staff was keenly aware that mentally as well as physically he was going through a very difficult time.

"Whenever the doctors came to treat me, they would always find something personal to talk about, and they would linger for a few extra minutes," he said.

"The nurses never served notice that I was about to have a bath or to have something else done. They would ask, instead, whether I was ready; if not, they would return later.

"They tried to accommodate me. Yet I knew that if I requested a delay I would be interfering with their work schedule, so invariably I'd say that I was ready. Their concern over my comfort, nevertheless, impressed me so much.

"Even the technicians who came to take blood specimens expressed hope that their interruptions would not have to continue much longer."

Several members of the Phillips 3 nursing team stood out particularly in the mind of the 49-year-old former skiing star:

Mrs. Phyllis Baxter, RN, who trained at Mary Hitchcock Hospital in Hanover, N.H., during the early 1950s when Mr. Dodge studied at Dartmouth College. They spent much time reminiscing about their days in Hanover and recalling Dartmouth songs.

Mrs. Barbara Noble, LPN, who is a ballooning enthusiast. She and the pa-

tient often talked about the technical aspects of soaring.

Miss Rita Debonis, RN, a long-time family friend of the Dodes and an MGH nurse. She not only took care of Brooks Dodge when assigned to Phillips 3 but she also often gave up nights off to continue assisting.

Miss Nancy Bixby, a young graduate of the MGH School of Nursing. Friendly and compassionate, Nancy demonstrated a special talent for instilling a feeling of security in seriously ill patients.

In the opinion of the specialists, nurses, and others involved in the care of Mr. Dodge, one person stood head and shoulders above everyone else, and

that was Ann Dodge.

"She was at her husband's side almost constantly," said Dr. Carter R. Rowe, an orthopedic surgeon who was instrumental in bringing the injured man to the MGH after his accident.

"She was at the hospital every day to help out with her husband's nursing care, sometimes arriving as early as 6 a.m. She knew not only when to help but was also skilled at not getting in the way.

"Some things are enough to defeat a person, but the crash was not going to defeat the Dodes. They just made up their minds that they were going to come through. They were a team."

Mrs. Dodge, according to Mrs. Noble, became an inspiration to the nurses. "When you have a patient who is critically injured and certain to be hospitalized for a long time," she explained, "the presence of someone as supportive as Mrs. Dodge can make your job seem almost easy."

The most glowing praise for Mrs. Dodge, by profession a lawyer and anti-trust specialist, came from her husband.

"I regained consciousness briefly as I was being taken into the hospital Emergency Ward several hours after the accident," he recalled. "Ann met me, put her hand into mine, told me that Dr. Rowe had arranged for a team of doctors and nurses to take care of me, and then assured me that everything was going to be all right.

"Before falling back into a coma, I had already begun to feel more at ease. I learned early in our marriage that 99 times out of 100 whatever Ann predicts turns out to be so."



Mrs. Mildred Smith, RN, (left), Head Nurse on Phillips 3, and Miss Nancy Bixby, RN, admire a collage of photographs presented by Brooks Dodge to thank all who treated him.

Dieters Find Appeal In Fabricated Foods But Must Be Wary

Health experts claim that of the 10 leading causes of death in the United States, 6 may be related to what people eat or drink.

They are heart disease, stroke, some forms of cancer, diabetes, arteriosclerosis, and cirrhosis of the liver.

Evidence of the dangers of improper nutrition, while admittedly incomplete in some cases, not only has stimulated a clear trend away from foods high in calories, cholesterol, and saturated fats but also has spawned a new industry: fabricated foods.

While purporting to look like and taste like the real thing, substitute or imitation foods are supposed to contain less, if any, of the objectionable ingredients found in the natural products.

Has the dieter's prayer been answered? Not yet. Some fabricated foods have been judged quite acceptable; others appear to have drawbacks.

As an example, Mrs. Margaret Mikkola, R.D., Dietitian for the Arteriosclerosis Center at Massachusetts Institute of Technology, pointed out that individuals on fat-modified, low-cholesterol diets must be very selective in buying nondairy creamers.

A member of the MGH Dietary Department's courtesy staff, Mrs. Mikkola

Miss Lillian Sonnenberg, R.D., left, who prescribes diets for heart patients, discusses food selection with Miss Diana Logan, a staff nurse on Warren-Baker 12, the MGH's intermediate cardiac care unit.



explained that most nondairy creamers contain coconut and palm oils which are highly saturated. A few brands, however, are made from soybean oil, a polyunsaturated oil, and these meet dietary requirements.

Mrs. Mikkola described cheese as one of the most difficult foods to assess.

"There are many cheeses on the market," she said, "and while some are low in cholesterol, their saturated fat content may be very high.

"Nutritional information is limited on numerous brands of imported cheeses. Even though the ingredients are listed and include an oil, you may not know how the oil was processed. The extent

to which oil is hardened determines the degree of fat saturation."

Margarine has less saturated fat than butter, but there are some 30 brands of margarine for sale, and not all are the same. Those made with a liquid vegetable oil, such as safflower, sunflower, or corn oil, are preferred for people on restrictive diets.

Dieters can buy excellent scrambled egg substitutes. Cholesterol free and composed mainly of egg whites, these products can be used widely in cooking recipes.

One type of egg substitute used at the MGH has about half the calories of the equivalent quantity of whole eggs.

For dieters who enjoy ham but cannot have it, Mrs. Mikkola suggests a turkey ham, available in several different brands. Actually smoked turkey, it is flavored to taste like ham and is much leaner.

Markets also offer sausage-flavored breakfast patties and links as well as bacon-flavored strips, both products made from soy protein. Although free of cholesterol, they do contain vegetable oils which push the caloric content close to that of the natural products represented.

Mrs. Mikkola cautioned that these patties, links, and strips are highly salted and should be eaten sparingly, or avoided altogether, by individuals on sodium restricted diets.

MGH menus omit meat substitutes. Something suitable for the dieter usually can be found among a variety of meat offerings.

"Few foods are eliminated entirely

(Concluded on Page 8)

A Recipe for Steak

Talk about new foods. . .

At Twentynine Palms, California, near San Bernardino, servicemen at a marine base often frequent a restaurant which offers complete steak dinners at about half the usual price.

Tasty, juicy, and nutritious, the low-cost steaks are the product of food technologists at the army's Research and Development Command in Natick, Mass.

Were it not for them, the restaurant would feature hamburgers.

The steaks are made from "restructured meat."

Small, irregular-sized chunks of high-quality beef, which normally would be ground up as hamburger, are processed, instead, through a machine which flakes the meat.

The flakes, retaining the beef's muscled texture, then are mixed to bind

them together. Put next into a press, the meat is shaped into an appetizing dinner steak.

Harvey Keene, a spokesman at the Natick Command, said that by the same process his laboratories have converted bits of pork, lamb, and veal into meal-sized cutlets.

Not only does the technique create a new menu item at a great saving but it also facilitates quality control, such as the elimination of unwanted fats.

Keene said the army's technologists now are working to restructure varieties of fish which have not enjoyed the greatest appeal in the past.

"There are many kinds of fish which make perfectly good eating," he said, "but don't seem to attract the consumer. We're hoping that the restructuring method will create a market for this wholesome food."

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Substitute Foods Satisfy the Dieter's Palate

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from the diet," said Miss Lillian Sonnenberg, R.D., who is assigned to Warren-Baker 12, an intermediate care floor for heart-surgery patients.

Miss Sonnenberg said that if a patient insists on red meat, usually high in saturated fat and cholesterol, a certain quantity may be included in his diet.

"We individualize every diet," she said. "We check into the past eating habits of every patient to learn what he was accustomed to having at home on an average week day, what his meals consisted of during the weekend, and what he usually ordered when he ate out. From this information and his medical data, we can determine the type of diet best for him."

The diet of a husky patient whose occupation entails a daily output of considerable physical energy will differ sharply from that of a patient of small physical stature whose daily exercise consists principally of pushing a pen in an office.

When a patient is served food of a modified nature, such as a low cholesterol tapioca made with skim milk and an egg substitute or a low-calorie dressing on a lettuce and tomato salad, Miss Sonnenberg details the reasons for the alteration.

In 1976, the MGH served patients 547,000 meals, and of this number 46 percent were modified for therapeutic purposes. Last year, with the number of meals virtually the same, the percentage affected by dietary restrictions climbed to 58.

For most of the patients involved, dieting became a way of life.

"It makes no sense for a patient to receive treatment and then return to eating habits which may have contributed to his or her illness in the first place," said Miss Annie Galbraith, R.D., Associate Director of the MGH

Dietary Department and a former president of the American Dietetic Association.

By cultivating healthier eating habits in the hospital, the patient will be more apt to stick to his new regimen at home.

This is where fabricated foods perform a useful service. Properly selected, they widen the food choices available to the dieter, pleasing his palate while keeping him on the proper nutritional track.

"Much of our emphasis in dietary instruction has to focus on teaching the patient how to read food package labels," said Miss Galbraith.

"We are dealing with people who are clearly at risk; yet we can't possibly touch upon all of the products available in the markets. Patients simply must learn how to read and interpret statements on nutrition."

The United States Food and Drug Administration has been investigating ways to clarify and simplify food labeling data.

Several new regulations will soon take effect.

One will specify that "low calorie" shall mean no more than 40 calories per serving.

Another will stipulate that foods designated as "reduced calorie" must have at least 33 percent fewer calories per serving than their conventional counterparts.

If a food marked "sugar free" cannot qualify as a low or reduced calorie item, as defined by the federal agency, the label will have to say so, or state "not for weight control."

Finally, as a general rule, any food specifically earmarked for consumers on diets will have to list somewhere on the label the full range of nutrients contained in the product.

Although modified by dietary requirements, dinner being served heart patient Stanley Jarocki of Easthampton, Mass., is attractive and tasty. Mrs. Kathleen Stakes, RN, does the honors.





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May, 1979

Reye's Syndrome: An Insidious Illness of Children

Harnessing Radiation to Benefit Mankind

Until the recent accident at Pennsylvania's Three Mile Island nuclear power plant, radiation was not exactly a household word.

But the incident near Harrisburg drove home an awareness among Americans of the hazards of radiation, and today people everywhere are asking themselves just how dangerous it is.

An understanding of radiation is necessary before one can know how to live with it. Very simply, radiation consists of tiny "bullets" of energy that travel through space at incredible speed.

Some types of radiation possess considerable destructive power but cannot penetrate very far. Conversely, radiation that moves in waves of energy called photons can be extremely penetrating.

Understandably, therefore, man's interest focuses most heavily on streams of photons. Depending on the frequency at which the wave patterns move, photons create such energy as light and heat, radio waves, ultraviolet rays, and X rays.

As atoms split or decay, they release ultrahigh frequency photons called gamma rays, similar to X rays. Put into a nuclear reactor and bombarded with neutrons, certain minerals, such as cobalt, can be made to emit gamma rays. Under carefully controlled conditions, specialists employ both X rays and gamma rays to attack and destroy cancerous tissue in patients.

So radiation serves man in many respects, enabling him to see, to feel the warmth of the sun, to communicate, and to improve the quality of life.

Pouring from the sky as cosmic rays and surfacing from naturally radioactive elements in the ground, such as uranium, radiation has been present since the dawn of creation. Over the past century, however, since man began efforts to harness the power of radiation, its levels in the American population have increased by an estimated 50 percent.

Contamination of the atmosphere and ground from certain uses of atomic energy, such as bomb tests, has contributed to the elevated radiation levels, but in the main the increase can be attributed to advances in medicine which employ radiation, both in the laboratory and the treatment room, to fight disease.

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Strict regulations govern the handling of all radioactive materials.

When 3-year-old Patty M. contracted an upper respiratory infection, no one seemed unduly concerned. Previously in excellent health, the child was put to bed, given the customary aspirin and fluids, and two days later, as expected, she improved.

The improvement, however, turned out to be short-lived. After another 48 hours passed, Patty suddenly experienced protracted sieges of vomiting. She also became increasingly lethargic, unresponsive, and restless, even combative at times.

The family's pediatrician had Patty admitted to a hospital near her western Massachusetts home, but when her health began to deteriorate, an ambulance transferred her to the MGH for treatment in its Pediatric Intensive Care Unit.

Comatose upon arrival, the youngster's condition continued to worsen. Despite every effort to reverse her decline, she died within a few days.

What had happened? What had transformed a seemingly common respiratory problem into a death-dealing affliction? Investigators at the MGH and at other medical centers across the nation are striving to find the answer and to do something about the disorder which each year strikes several hundred youngsters after influenza, chicken pox, or some other types of virus.

The disease bears the label Reye's syndrome. A decade ago as many as two-thirds of the children affected, ranging in age from infancy to 16 years, died. Today, as a result of ever improving supportive care, the mortality toll has fallen to one-third. And investigators are optimistic that their

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AN EDITORIAL:

Three Mile Island

"Three Mile Island" has become the nadir of the nuclear industry. Surely the accident dramatized the need to reassess the safety aspects of atomic power. Improved, fail-safe techniques must be devised to reduce further the risk of a catastrophe which could claim directly or indirectly thousands of lives. Public confidence must be restored.

However, in weighing the meaning of Three Mile Island, one should examine the historical background of progress. Indeed every technological advance has carried with it some degree of risk. While the bow and arrow brought man an increased food supply, its misuse in war cost tens of thousands of lives. Even employed solely for hunting, the bow and arrow has caused countless accidental killings.

Man's ability to make a fire has spread warmth, provided light, laid the foundation for industry, and promoted the culinary art. At the same time uncontrolled flames have long terrorized mankind. And even controlled fire does pollute the air we breathe. You can almost see some primitive man in his poorly ventilated cave blinking at the first bonfire and exclaiming to his hairy friend, "Put it out. It's too dangerous. Besides the Environmental Protection Agency will never approve."

Fire burned much of 17th century London. In the 19th century the smoke of the Industrial Revolution blackened and polluted London's sky. Even so, recent evidence has shown that in prehistoric times the fire in the unventilated cave subjected the troglodyte to more pollution than the soot and smoke of the 19th and 20th century do to modern man.

People feared the explosive potential of the first steam engine. Many recoiled in terror at the first automobile. When the Wright brothers conquered the air, few persons dared to think of themselves ever attempting flight. Today as we stand poised to establish permanent space shuttles, few except the very young and the very intrepid look forward to interplanetary travel.

New inventions intrigue man with their challenges of opening undreamed of vistas—until the first automobile accident, the first explosion of a steam engine, or the death of astronauts. Then fear makes us reexamine the hazards. All to the good; for reasonable concern invokes the cautions we should never have overlooked in the first place had not the exhilaration of the breakthrough driven us so fast.

In studying a new pill, device, or technique, medicine weighs benefit against risk. Sometimes, as we know all too well, medical science also errs in its judgment. Nevertheless over the long haul most of these decisions have benefited us greatly. The same type of risk-benefit ratio can aid society in deciding the role of nuclear power.

Australian Pathologist Provides First Clues To Syndrome Puzzle

(Continued from Page 1)

research in the next few years will knock the death toll down much further.

For a number of years, physicians encountering the malady tended to diagnose it as an acute toxic brain disturbance (encephalopathy) of one kind or another. Many conditions can lead to coma: Insufficient glucose in the blood (hypoglycemia), excessive fluid in the brain (cerebral edema), lack of oxygen in the body's tissues (hypoxia), or shock (marked loss of blood pressure).

In 1963, the first parts of the puzzle came together. Writing in the British medical journal *Lancet*, an Australian pediatric pathologist, Dr. R. D. K. Reye, argued convincingly that the syndrome presented a consistent clinical picture. The pathology, he said, included an infiltration of fat into the liver, as well as hypoglycemia and an elevation of certain liver enzymes.

This was believed to be the first time that liver involvement was emphasized. The largest glandular organ in the body, the liver performs literally thousands of major biochemical functions.

The chemical factory processes all of the food entering the body, filters toxic substances from the blood, manufactures bile to aid in the digestion and absorption of fats, regulates the concentration of amino acids (protein builders) in the blood, and stores sugar, to be used when needed for energy.

Put upon the proper investigative path, researchers soon confirmed the observations of Dr. Reye and his associates, and as time passed the picture continued to develop.

Increasingly, evidence pointed to mitochondria as the initial targets of whatever was triggering the changeover from a usually mild virus to a potentially lethal sickness. Mitochondria are the "power packs" or "batteries" in all living cells, providing the energy needed for the cells to carry out roles assigned to them by nature.

"Some unidentified product of the virus attacks the mitochondria in the

Photographs: Pages 3, 6, 7, 8, Myron Daniels; p. 4, Robert Crivello; p. 5, MGH Photo Lab.

liver and blocks certain metabolic activities," said Dr. G. Robert DeLong, Chief of the MGH Pediatric Neurology Unit and an Assistant Professor of Neurology at Harvard Medical School. "Most importantly, perhaps, the invading substance damages two enzymes whose job is to convert ammonia into urea."

Ammonia is a by-product of nitrogen metabolism in the body and is excreted as urea, the chief nitrogenous constituent of urine.

In their studies of children with Reye's syndrome, Dr. DeLong and his associates also discovered a massive increase in breakdown of body protein which led to great amounts of ammonia being presented to the liver for detoxification.

The combination of this "flood" and the failure of the liver's metabolic machinery to convert ammonia into urea creates a crisis. The ammonia accumulates, travels to the brain, and in the opinion of some is the chief culprit in causing coma, cerebral edema, and, sometimes, death.

The MGH team has documented in studies on a series of Reye's syndrome patients the effects of the elevated ammonia (hyperammonemia) on brain energy metabolism and brain control of respiration.

Two points of view have been expressed concerning the effect of Reye's

syndrome on mitochondria. Some investigators, including those at the MGH, contend that only liver mitochondrial enzymes are involved; others believe the syndrome affects all mitochondrial enzymes in the body.

Recently, in a paper published in Toronto, a medical team studying the illness reported finding abnormal mitochondrial enzymes in the liver but normal ones in the brain and muscle.

Dr. DeLong said the research suggesting that the brain was being affected secondarily by something from the liver "corresponds to our findings on the effect of hyperammonemia on brain metabolism."

The MGH team Dr. DeLong alluded to includes two other members of the Children's Service, Drs. Daniel C. Shannon, Director of Pulmonary Research, and W. Allan Walker, Chief of the Pediatric Gastrointestinal Unit. Both are also Associate Professors of Pediatrics at Harvard Medical School.

An important "push" in the study of Reye's syndrome was provided several years ago by Drs. Vivian E. Shih, Director of the MGH Amino Acid Disorders Laboratory, and Harvey L. Levy, an MGH neurologist and pediatrician who also heads the metabolic disorders unit at the State Laboratory Institute in Boston.

Looking at the amino acid pattern in Reye's syndrome patients, Drs. Shih and Levy were surprised to discover a very close similarity to patterns associated with a certain genetic disease.

This led the two researchers together with Drs. DeLong and Philip Snodgrass, a gastroenterologist then of Peter Bent Brigham Hospital in Boston and now of the University of Indiana, to focus on two mitochondrial enzymes (ornithine transcarbamylase and carbamyl phosphate synthetase), having activities markedly depressed during the course of the disease.

The study revealed that in the metabolic chain by which these enzymes turn ammonia into urea one amino acid, citrulline, a product of ornithine transcarbamylase, was extremely low in activity.

The administration of citrulline to several critically ill MGH patients in advanced stages of Reye's syndrome resulted in a marked reduction of their elevated blood ammonia levels. Of five patients, four survived.

The role of citrulline, however, continues to be evaluated at the MGH.



Using an incubator, Dr. Vivian Shih, Director of the MGH Amino Acid Disorders Laboratory, measures the activity of an enzyme (ornithine transcarbamylase) in liver tissue from a Reye's syndrome patient.

During the early stages of the MGH inquiry into the disease, the investigators received valuable assistance from Dr. Thomas H. Glick, a neurologist now at Cambridge Hospital in Cambridge, Mass., and still a member of the MGH Neurology Service. He had conducted epidemiological studies on the illness while at the federal Center for Disease Control in Atlanta, Ga.

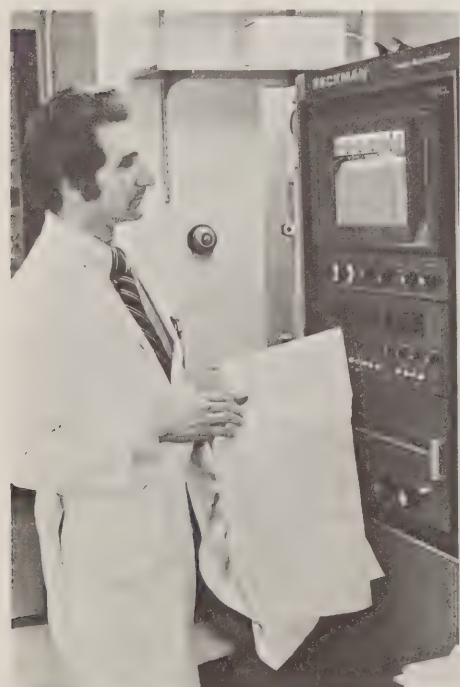
More recently, the search for the cause of Reye's syndrome gained impetus as a result of work by June R. Aprille, Ph.D., now with the Department of Biology at Tufts University.

While at the MGH, Dr. Aprille, a cell biologist and biochemist, discovered a factor in blood that seems to impair mitochondrial activity. Whether this factor triggers Reye's syndrome or comes into play after the liver already has been damaged remains to be determined.

Other researchers are trying to learn whether an abnormal gene is responsible for the syndrome, which affects 1 child in every 2,400 who have contracted Influenza B.

Perhaps two factors, not one, produce the often deadly ailment. There have been suggestions that a toxic factor acting in combination with the virus may cause the disorder. This possibility, too, is under study.

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An amino acid analyzer enables Dr. Harvey L. Levy, MGH neurologist and pediatrician, to test blood for suspected amino acid abnormalities characteristic of Reye's syndrome.

Scientists Disagree On Radiation Safety

(Continued from Page 1)

Scientists measure radiation in terms of rems, units reflecting the degree of effect upon human cells. Since radiation levels may be much less than one rem, the expression millirem (one thousandth of a rem) is often heard.

Over a year's time, the average person receives about 100 millirems of exposure from natural, or so-called background, radiation.

Residents of mile-high Denver are exposed to perhaps half again as much since cosmic ray activity is more intense in that area and Colorado has rich deposits of uranium ore.

Last year, a committee of 16 scientists voted at a meeting on whether they thought background radiation had any untoward effect on health. Half the members voted no, the other half yes.

"There may be damage, but when you're dealing with exposure that low, the body may well have built-in healing

X rays are vital for the proper diagnosis and treatment of many disorders. Shown at right is Dr. Claude E. Welch, MGH Senior Surgeon.



mechanisms," said Edward W. Webster, Ph.D., an MGH radiological physicist and the hospital's Radiation Safety Officer.

He said that despite their increased radiation exposure, people in Colorado develop less cancer than residents of coastal Boston. "No one knows why,"

he remarked, "unless Colorado, in general, is a healthier place in which to live."

Air travelers subject themselves to somewhat increased radiation. On an airplane cruising at 38,000 feet, the exposure rate is 30 times normal. Flying from Boston to Los Angeles and

Effects of Reye's Syndrome Vary

(Concluded from Page 3)

Meantime, efforts to improve supportive care go on. The mainstays of this treatment include supplying adequate blood sugar, controlling increased intracranial pressure, and careful attention to adequate respiration and proper fluid balance.

Mannitol, a form of sugar, helps to reduce within the skull the pressure caused by cerebral edema. "The drug is good," Dr. DeLong said, "but not really good enough in very severe cases."

Several methods have been used to try to extract from blood whatever toxin was causing Reye's syndrome.

Exchange transfusions, the complete replacement of the patient's blood, have enjoyed favorable results in some medical centers but not in others, including the MGH.

Less successful have been "total body washouts," a more drastic form of blood transfusion, and peritoneal dialysis. The latter involves introducing certain fluids into the abdominal cavity to absorb toxins.

Complicating the care of the Reye's syndrome patient is the variable effect

of the disease.

Speaking recently at an MGH medical meeting (Pediatric Grand Rounds), Dr. Donald N. Medearis, Jr., Chief of the Children's Service, said that hypoglycemia and seizures tend to develop among young patients early in the course of their illness, and not among older ones.

In addition, he said, the younger Reye's syndrome patients tend to be from poor urban neighborhoods while the older children live in rural areas.

Since, in the past, most incidents of Reye's syndrome followed bouts with Influenza B virus, suggestions have been made that perhaps a vaccine against the virus can also sidetrack the syndrome.

In his talk, Dr. Medearis said the vaccine is probably not the answer. "Flu vaccine is short-lived and works only moderately well," he explained. And he further pointed out that the frequency of fever and illness associated with the giving of flu vaccine poses a problem.

Also pointing up the capricious nature of Reye's syndrome is the fact that a number of outbreaks have been noted this year following Influenza A

virus, instead of the usual B.

In general, the attitude of most MGH investigators studying Reye's syndrome is that the next major step against the disease will depend on some new basic understanding of its physiology.

Patients With Reye's Need Quick Attention

Although the severity of Reye's syndrome varies from patient to patient, death from the disease can strike with unusual speed.

Criteria to assess the state of the relatively newly discovered malady differ among physicians, but in general the following symptoms apply:

Stage 1—Lethargy, unusual quietness, sleepy feeling.

Stage 2—Confusion, restlessness, sometimes delirium, stupor.

Stage 3—Coma, hyperventilation.

Stage 4—Deepened coma, extension and rigidity of limbs (decerebrate posturing).

Stage 5—Respiratory arrest, flaccidity, absence of neurologic activity.

Since Reye's syndrome can progress from onset to death in as few as six hours, early diagnosis and intensive care are imperative.

back would be equivalent to a five millirem dose (or one-sixth the exposure from a chest X ray).

The granite, brick, and mortar used in building construction contain traces of radioactivity. How much, depends on where the materials originated.

The federal government recommends no more than 500 millirems exposure per year exclusive of dosage from medical care. Workers who handle radioactive materials (such as in a hospital) are allowed up to 5,000 millirems per year.

"During 1978, no one at the MGH came near the allowable limit," said Dr. Webster, who is also Professor of Radiology at Harvard Medical School. "Eight closely involved individuals received between 500 and 1,000 millirems, but 93 percent of the overall force working with radiation recorded less than 100 millirems of exposure, the equivalent of what the average person on the street gets from normal background radiation."

In attacking cancer, doctors may bombard a tumor with as much as 6,000 rems (six million millirems) of radiation in divided doses, but it is important to remember that this amount extends only to a very small area. Inflicted body wide, less than one-tenth of that dosage would be fatal. Confined to a small segment, the rems destroy almost exclusively the cancer.

Medical and dental X-ray examinations account for the greatest percentage of radiation used in the health care field. Federal figures show that more than 130 million Americans receive one



With a technician posing as a patient, Dr. Jack R. Dreyfuss, MGH radiologist, demonstrates how he would conduct an "upper gastrointestinal (GI) series" using a high gain, image-amplification X-ray machine. A fluoroscopic "picture" of the patient's digestive system would appear on TV monitor.

or more X rays annually.

The level of skin exposure varies widely in diagnostic testing, from the 30 millirems for a chest X ray to as much as 20,000 millirems for an angiography exam. Again these doses are aimed at specific parts of the anatomy.

Physicians regard two areas of the body—the bone marrow and the reproductive organs—as particularly sensitive to radiation. Federal regulations for radiation workers limit dosage to those organs to one-third the amount that other organs might receive.

The bone marrow maintains the body's supply of blood cells. Damage

to the marrow may interfere with the production of normal white cells and wipe out the natural defenses against infection. Later, an uncontrolled production of white cells (leukemia) may develop. An underproduction of oxygen-bearing red cells leads to anemia.

The number of clotting factors (platelets) in the blood also would diminish under the effects of excessive radiation and increase the possibility of hemorrhage.

As for the danger to reproductive organs, or gonads, harmful changes (mutations) might be induced by extreme radiation and be passed on to future generations of offspring, although this is yet to be observed in humans.

Additionally, during pregnancy, the risk to a fetus from direct radiation exposure may be 10 times higher than the danger to an adult receiving the same dose. At a high enough dose, danger increases that the child might be born with some malformation. Some studies also indicate that a child irradiated while in the womb has a somewhat increased likelihood of developing cancer during the first 10 years of life.

The evidence, however, is far from conclusive. Dr. Webster pointed out that in Japan a number of pregnant women exposed to heavy radiation from the World War II atomic bombs later gave birth to children who did not develop cancer.

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Patient is about to undergo angiography, an X-ray procedure for viewing blood vessels in the body. Contrast material injected into an artery allows the vessels to be seen.



A. Gordon Adams of Rydal, Pa., listens with interest as Dr. J. Warren Harthorne, MGH cardiologist, describes latest features of cardiac pacemakers. Mr. Adams has worn a pacemaker for several years.

Pacemakers Adjust Wavering Beats Of the Heart

As the board chairman of two textile corporations with manufacturing plants in as many states and a work force totaling 1,800, A. Gordon Adams of Rydal, Pa., carries weighty responsibilities on his shoulders.

His day at the office stretches until 8 p.m., and two days a week usually are devoted to business travel. When he finds time to relax, he spends it manning one of his two sailboats. Until two years ago, he competed in sailing races.

For a man who will turn 79 next month, Mr. Adams' routine is rigorous. When in addition you consider that some five years ago he developed a heart problem, his ability to continue

Frequent Inspections of Radiation Equipment

(Concluded from Page 5)

This bolsters the argument of some scientists that the rate of cancer produced by radiation is infinitesimal when one looks at the overall incidence of the disease from all possible causes.

Dr. Webster put it rather dramatically:

"Normally, during the lifetime of 10,000 people, you would find about 1,700 with some fatal form of cancer. If the same 10,000 had been exposed to one rem of radiation, and you followed them for the rest of their lives, you would be able to attribute only one case of cancer to the radiation."

Compared to this one case, there would be about 300 patients with cancer related to smoking.

However small the risk, pregnant women are urged to avoid X rays of the abdomen whenever possible to protect their unborn children.

Each machine used at the MGH for a radiological procedure, whether it be fluoroscopy, mammography, computerized tomography, angiography, or some other X-ray technique, is inspected at least once a year to make certain that it meets government safety standards and that it emits the precisely prescribed dosage.

Even more frequent are inspections of MGH laboratories involved with radioactive materials. Such labs may be

visited once a month, or even once a week, depending on the degree of risk posed by the work being done.

Dr. Webster estimated that about 40 different radioactive substances are employed at the MGH for investigative, diagnostic, or therapeutic purposes.

As examples, in the attack on cancers, radioactive iridium may be implanted in the tumors and later removed after the cells are killed. Radioactive iodine can perform the same service. The iodine is left in the tissue, however, and the radioactivity eventually dissipates. For the treatment of some types of blood diseases, radioactive phosphorus has proved beneficial.

A technique, developed by several institutions including the MGH, for diagnosing heart disease employs a weak radioactive solution containing the isotope thallium-201.

While exercising on a treadmill to maximize blood flow to his heart, a patient receives an injection of the solution and then lies under a nuclear medicine (gamma) camera. Specialists study movement of the isotope through the heart and look for areas where the thallium cannot concentrate. Such areas would indicate the presence of blood-starved tissue.

Although the test can provide valuable data on countless patients, doctors emphasize that it is not useful in all

cases of heart disease and that persons considering such an examination should first seek the advice of their personal physician.

Medical science has also evolved a method of viewing internal organs without the risks inherent in X rays. The technique, called ultrasonography, produces images on a special recorder by using sound waves. Although ultrasonic waves at very high intensities can cause tissue damage, the relatively low energy levels required for diagnostic purposes are believed completely safe.

Ultrasound is particularly useful to physicians examining expectant mothers for potential prenatal defects.

Dr. Webster believes, however, that radiation will be a necessary medical tool for a long time to come. Ultrasound, for example, cannot compete with X rays in showing dense material such as bone, and, next to surgery, radiation is the treatment of choice for cancer.

A member of the National Council on Radiation Protection and an adviser to the federal Nuclear Regulatory Commission on the medical uses of radioactivity, Dr. Webster urges people not to refuse X-ray studies solely to avoid radiation exposure.

"The risk from X ray," he said, "is very much lower than the risk the patient is running from his illness."

his energetic pace seems almost astonishing.

Mr. Adams, however, has help. Implanted in his chest and connected to his heart by electrodes is a device the size of a cigarette lighter. When the rate of his heart slows too much, the implant, a cardiac pacemaker, automatically cuts in, fires electrical impulses to the heart muscle, and restores a normal beat. The unit then shuts off.

Mr. Adams' pacemaker was prescribed because his pulse sometimes slowed to as few as 42 beats per minute.

"I was not able to function without becoming tired very quickly," he remarked while at the MGH recently for a checkup. "But with my pacemaker I'm back at top speed, even more efficient, perhaps, than before it became a part of my existence."

Mr. Adams expressed dismay that many "very good" men and women in the business world accept early retirement when pacemakers might revive their ability to handle the daily pressures to which they had been accustomed.

Made possible by the invention of the transistor and improved upon tremendously by the fruits of space age technology, cardiac pacemakers oversee the well-being of an estimated 200,000 people around the world.

They range from babies born with disturbances of the heart to patients in their 80s, 90s, and occasionally more than 100 years of age, who are beset with degenerative forms of heart disease.

The list of notables who wear pace-

makers is long. Examples are retired United States Supreme Court Justice William O. Douglas; Leonid Brezhnev and Nikolai Podgorny, Soviet leaders; Dr. Oliver Cope, an MGH Senior Surgeon; Roy Wilkins, civil rights leader; and Henry Fonda, the film star.

At the MGH, specialists perform about 300 pacemaker procedures annually. Half involve the first-time installation of a pacemaker system; the others are concerned with the service, adjustment, or replacement of existing implants.

"Many people mistakenly believe that the pacemaker strengthens a weak heart, corrects damaged heart valves, or improves the symptoms of coronary disease," said Dr. J. Warren Harthorne, an MGH cardiologist and Director of the hospital's Pacemaker Laboratory. "The instrument only regulates the rhythm of the heart, particularly if the beat becomes excessively slow."

Irregular beats (arrhythmias) may be felt as a pounding in the chest, faintness, dizziness, shortness of breath, or a choking sensation.

Cardiac rhythm may be disrupted by organic disease brought on by a viral or other infection or by nervousness, anemia, or thyroid difficulties.

Sometimes, scars left by rheumatic fever, a heart attack, or cardiac surgery will block the normal transmission of electrical signals between the upper and lower chambers of the heart.

Physicians prescribe drugs such as digitalis to prevent the heart from lagging, but medication may not be enough. In Adams-Stokes syndrome,

for example, in which a beat may be delayed from four to ten seconds, the artificial electronic pacemaker has become an indispensable corrective tool.

"One cannot make the generalization that a pacemaker is this thing or that thing for all people," Dr. Harthorne cautioned. "Each model is designed to provide a specific function for a particular disease process."

He said that more than two dozen companies produce pacemakers, and they come in as many as 250 models. For an infant, the specialist implants tiny ones. Others are necessarily bulky because they have to contain many parts in order to carry out more actions upon the heart.

Although a pacemaker recipient, because of some aspect of his medical problem, might have to curtail certain activities, Dr. Harthorne said that having a pacemaker does not call for restrictions of any kind.

"The only request we make of patients," he said, "is that they tell us of any interests they have which could affect a decision on where to install the device."

"If the patient, for example, is a violinist, we wouldn't want to put the pacemaker on the side of his body where he holds the violin."

"In terms of optimal performance, however, it makes no difference whether the installation is in the left or right side of the chest."

The principle of electrically stimulating a faltering human heart was first outlined and demonstrated 27 years ago by Dr. Paul Zoll of Boston's Beth Israel Hospital. The stimulus, provided externally through the chest wall, initially drew a mixed reaction from Dr. Zoll's colleagues, but the idea fueled the imagination of engineers.

With transistors already on the scene making possible the construction of tiny electronic circuits to carry out major functions, the engineers sought to design a self-powered device implantable within the body to stimulate the heart over long periods.

The first such pacemaker came into use in 1959, but hopes for long-term effectiveness were dashed by such shortcomings as metal fatigue and erratic energy sources.

Persistence paid off. Just as the space age spawned the electronic calculator and digital watch, so did the new tech-



An external pacemaker regulates the heart rhythm of Leonel Martinho of Falmouth, Mass., during his hospitalization for cardiac surgery. Miss Lisa Haeger, RN, adjusts the device.

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Lithium Offers Best Power for Pacemakers

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nology enable scientists to alter the makeup of pacemakers.

Hand-soldered circuits with up to 30 solid-state components were gradually replaced by units containing tiny, multi-layered chips. These chips could perform tasks that in earlier days would have required several thousand components.

From 1958 until 1973, physicians relied primarily upon mercury-zinc batteries to power the pacemakers. Despite modifications in design to improve efficiency, however, the power packs offered a maximum of four years' service.

Nuclear energy entered the pacemaker field in the late 1960s but has enjoyed limited popularity, mainly because of extensive bureaucratic paper work aimed at keeping track of the nuclear devices. Additionally, they are very expensive.

A satisfactory compromise came in the early 1970s with the advent of batteries made of lithium. Employed

almost universally today in new pacemaker systems, these batteries have a projected life span ranging from 7 to 15 years depending upon extent of use.

To ensure that his pacemaker is functioning properly and contains sufficient reserve power, each of Dr. Harthorne's patients undergoes an electrocardiogram (ECG) periodically, the time interval dependent upon the type of pacemaker involved.

If hospital or office visits are inconvenient, the patient need not leave his home. He can simply attach the electrodes of a small transmission device to certain areas of his body, and ECG sound signals can be relayed by telephone to a receiving point. There, a machine decodes the sounds and converts them into the familiar ECG printout.

Since the pacemaker is essentially a listening instrument ever on the alert for erratic heartbeats, wearers occasionally express concern that the sensors may pick up more than they are supposed to, i.e. signals from radar

stations, microwave ovens, electric shavers, etc.

"Although this is theoretically possible, it almost never happens," said Dr. Harthorne, who is also an Assistant Professor of Medicine at Harvard Medical School. "A titanium capsule carefully protects the electronic circuitry in today's devices."

From time to time, a manufacturer has recalled some pacemakers. News media accounts tend to make these events seem more serious than they actually are.

"Most of them concern minor deviations of observed performance which might really require only increased surveillance," Dr. Harthorne said.

"Occasionally, devices with more serious problems have required replacement. At the MGH, fewer than a dozen individual pulse generators have had to be replaced for such reasons in the last 10 years."

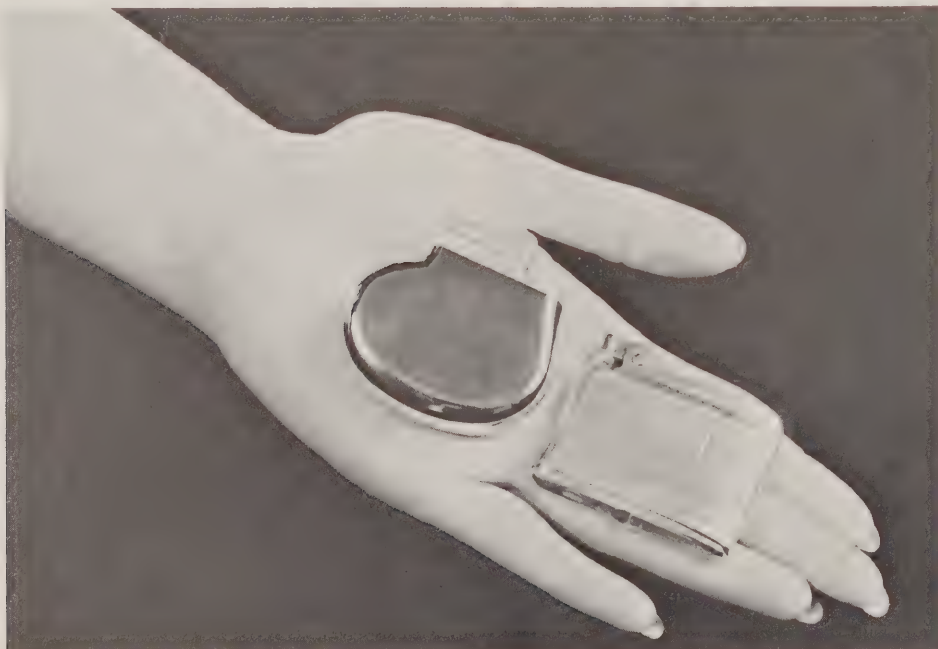
While patients with internal pacemakers generally anticipate their use to be a lifelong arrangement, other individuals need only temporary cardiac help. An external pacemaker is available to accommodate them. External support may be required for a patient during and after delicate or troublesome surgery.

Efforts to improve the life span and capabilities of pacemaker systems continue unabated. Engineers are working to incorporate tiny microprocessors or computers into cardiac stimulators to assess patients' needs instantaneously and then provide the required aid.

Devices that enable a physician to externally reprogram the performance of an internal pacemaker are already in use. After setting the programmer, the doctor simply places it on the patient's chest and pushes a button.

When the instrument first became available, it could alter 32 pacemaker functions. The latest version permits more than one million changes.

"It boggles the mind," said Dr. Harthorne.



Most of today's internal pacemakers like the one on the left are about the size of a cigarette lighter.



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Using Protons to Repair Malformed Blood Vessels

Ulcers Can Strike Almost Anyone

Many years ago, comedian Fred Allen visited his hometown of Boston and quipped to newsmen that "in New York the radio business is so nerve-racking that people are dying in their forties."

"Where I work," he said, "there's an ulcer on a chair. Just an ulcer. And nobody knows who it was."

Times have changed, including notions about ulcers. Just as gout is no longer characterized as a rich man's disease, ulcers are no longer viewed as the exclusive symbol of the high-pressured business executive.

Stress, to be sure, contributes to the formation of some ulcers, but the degree of stress is not as critical as the way an individual reacts to the pressure. Some people collapse under tension; others thrive on it.

Even in the absence of stress, people who seem perfectly calm and relaxed may develop ulcers, or sores, in the lining of the stomach (gastric ulcers) or the first portion of the small intestine (duodenal ulcers).

In some instances, duodenal ulcers, which occur much more often than gastric ones, are associated with a higher production of stomach juices (hydrochloric acid and pepsin) which attack the wall of the intestine.

For some unknown reason, gastric ulcers are not usually associated with increased stomach secretions.

"Ulcers often form in the stomach when the acid output is below normal," said Dr. Stephen E. Goldfinger, an MGH physician and member of the hospital's Gastrointestinal Unit. "The problem here appears to stem from a

decreased resistance of tissue to acid and pepsin."

In the past, studies have indicated that 1 American in every 10 will develop an ulcer at some time in his or her life. The incidence in recent years has been sliding, however. Nobody knows why.

Not only has the incidence decreased but the number of operations for the most common complications of ulcers has also lessened.

The sore, much like a canker inside the mouth, may erode the wall of an artery and cause bleeding. Or scar tissue associated with the ulcer may obstruct the stomach or intestine. Or the erosion may actually perforate the wall

(Continued on Page 2)

A teen-aged girl traveled to the MGH from her home in the Midwest for a neurologic evaluation after suffering a series of seizures over a two-month period.

Although seemingly well until stricken, the youngster, a pretty 15-year-old, was found to have a serious and inoperable brain disorder.

As bleak as the future appeared then, the girl today is healthy, works as a model, and frequently engages in gymnastics.

By extending her trip from the Midwest another few miles, across the Charles River to Harvard University in Cambridge, an MGH team was able to provide dramatic treatment that started the patient on the road to recovery.

Dr. Raymond D. Adams, then MGH Chief of Neurology, diagnosed the patient's condition as an arteriovenous malformation (AVM), a mass or tangle of abnormal blood vessels, in the brain. The AVM was disrupting normal cerebral function.

Armed with Dr. Adams' findings and recommendations, Dr. Raymond N. Kjellberg, an MGH neurosurgeon, attacked the diseased region with proton beam radiosurgery, employing Harvard's 160 million electron volt cyclotron.

The one-sitting procedure is the only one available in the United States to persons with otherwise inoperable AVMs, and one of but two in the world. Until now the therapy has been described exclusively in formal medical publications.

During a single two-hour period, while under local anesthesia, the girl received a bombardment of proton radiation aimed precisely at her AVM,

(Continued on Page 6)



Getting close to animals living in the wild raises a danger of being bitten and contracting disease. (Story on page 4)



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AN EDITORIAL:

The All-Purpose Animals

Animals fascinate humans. Zoos, properly called zoological gardens, have a history that dates to ancient times. Some animals, like the duck-bill platypus of Australia, stimulate the intellect. Some, like the monkey, make us laugh. Others, like the koala bear, look so cuddly we want to hold them. Certain animals, like snakes, fill us with fear. Some, like the skunk, offend our nostrils. Rodents are loathsome. The persistent yap of a puppy annoys us.

As civilization has progressed, man has learned to domesticate many species. From some, like cattle, we derive food. From others, like sheep, we obtain material for clothing. Horses and other beasts of burden provide transportation. Or, they may in primitive countries supply power by turning waterwheels or pulling plows. They may protect us, as dogs do. They may, like cats which kill mice, rid us of unpleasant animals. In some cases their main function may be to provide us with love and affection.

Yes, animals are many things. But as an article in this issue notes, they also bite—sometimes when unprovoked. With this last and most unpleasant characteristic, we remind our readers that pets as well as wild animals occasionally cause harm. Especially to children too young to have learned the difference between the relatively unbridled tolerance of a devoted pet and the instinctive attack reaction of a cornered wild animal or a provoked domestic animal which does not know the child. A little common sense and knowledge of first aid can make this a safer summer around pets and wildlife.

Letter to the Editor

The *MGH News* received one letter praising and one critical of its May editorial on Three Mile Island. Space limits us to a single letter:

Dear Editor:

I have previously been pleased and enlightened by what I have read in your *MGH News*. Having just read your piece for the May issue, I am shocked. How could you be so poorly informed?

I hope you will read or reread the

front page item in Sunday's (5/13/79) *New York Times* which suggests that the special management of "news" has been on the part of some persons in governmental posts who have been less than scrupulous about scientific evidence and investigative reporting.

Of course medicine is an applied art which uses scientific method to discern and treat, and sure there is uncertainty, and benefits come with costs and adverse side effects for patients who gladly take the risk trusting the skill, integrity and good will of their doctors. But when you write about the Three Mile

Helpful Ulcer Drug Still Under Study

(Continued from Page 1)

of either organ, spilling its caustic contents into the abdominal cavity, causing peritonitis.

The complications of ulcers have claimed more than 8,000 American lives annually in the past and, in terms of medical expenses and lost hours of work, the disease each year has created a more than \$1 billion drain in the nation's economy.

In treating ulcers caused or aggravated by increased stomach acidity, physicians have found one particular drug to be most helpful.

"There's no question that cimetidine is extremely effective in inhibiting the secretion of stomach acid," said Dr. Goldfinger, who is also Associate Professor of Medicine at Harvard Medical School and its Associate Dean for Continuing Education.

Cimetidine, introduced in the United States two years ago, has been taken by an estimated 10 million people around the world, but Dr. Goldfinger said it is still too early to know whether the drug is relatively free of potentially serious long-term side effects.

Recently, a research team at the University of Pittsburgh Medical School reported in the *New England Journal of Medicine* that cimetidine can lower sperm count and may cause transient sterility in those whose count is already quite low.

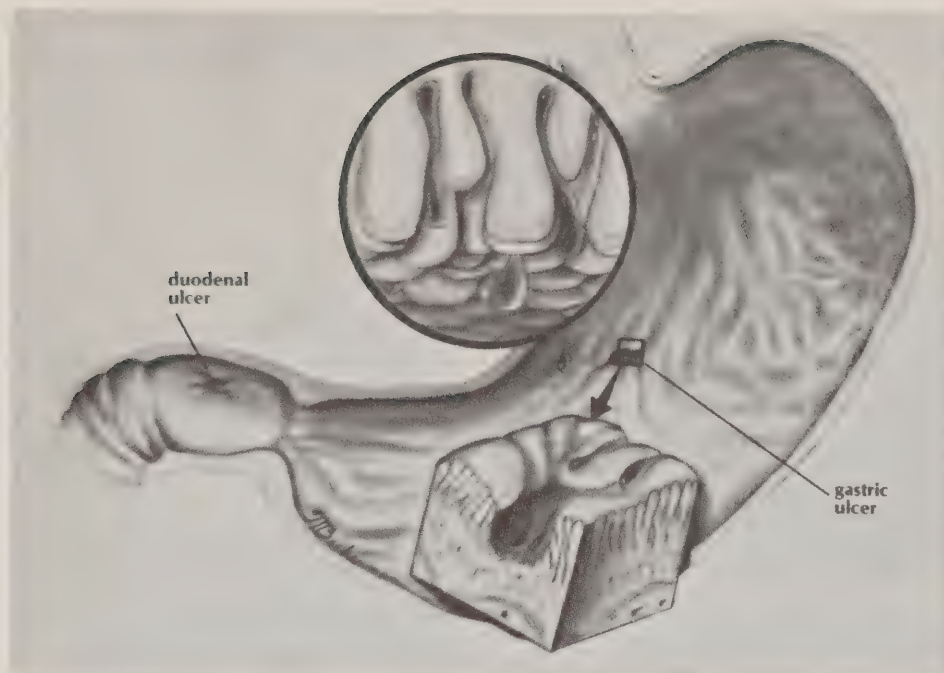
The director of the study group added, however, that if the ulcer medication is taken for six weeks, the duration recommended by the United States Food and Drug Administration, the risk is not significant.

During the active phase of an ulcer, Dr. Goldfinger recommends two table-

Island episode and its attendant risks, you are into different orders of magnitude.

John Arserian, Ph.D.
Rockport, Mass.

(*Editor's Note:* The *News* editorial referred to had as its thrust to caution against a hysterical decision that ignores history and fails to weigh potential risk and benefit. The editorial did not conclude in favor of or against the use of nuclear power but pointed out the importance of weighing objectively the potential risks and benefits of nuclear power.)



Excessive secretion of acid and pepsin in the stomach is a leading cause of duodenal ulcers while stomach (gastric) ulcers can occur when acid output is below normal.

spoons of liquid antacid one hour after each meal and at bedtime.

"Antispasmodic or anticholinergic drugs, which reduce contractions of the intestines, may also be helpful at bedtime," he said. "These contractions may be the source of some of the gnawing pain which ulcer patients feel."

If a potentially life-threatening complication results from an ulcer, or it fails to respond to conventional medical treatment, surgery becomes necessary. An estimated 15 percent of ulcer patients face operations.

The standard procedure, the one by which all types of ulcer surgery are measured, involves severing the main trunks of the vagus nerve, linking the brain with the stomach. Cutting the nerve (a truncal vagotomy) turns off a stimulus for acid secretion in the upper part of the stomach.

Removal of the lower end of the stomach, the antrum, eliminates a second stimulus. The procedure (an antrectomy) prevents further production of an acid-promoting hormone called gastrin.

Following an antrectomy, the surgeon must construct a new system for draining the stomach's contents into the intestines.

"The truncal vagotomy and antrectomy are nearly universally effective," said Dr. Ronald A. Malt, MGH Chief of Gastroenterological Surgery. "The patient's chance of encountering further ulcer problems is reduced by these procedures to only one or two percent."

Techniques employing truncal vagotomies and eliminating the need for antrectomies also have proved effective in treating many cases of ulcers.

After cutting the vagus nerves, the surgeon, instead of removing the antrum, may either enlarge the stomach's normal outlet (the pylorus) or connect a section of small bowel directly to the stomach.

The idea, Dr. Malt explained, is to speed food through the stomach before the gastric contents can stimulate the antrum into making more acid-producing hormone.

In the past 5 to 10 years, an operation called a "highly selective" or "proximal" gastric vagotomy has come into vogue. Pioneered by surgeons in several European countries, the procedure involves cutting only those fibers of the vagus nerve which relate to stomach acid production. Other fibers that remain intact preserve the stomach's motor functions.

"In the hands of surgeons who don't do the operation every day, the ulcer recurrence rate after a highly selective vagotomy can be higher than 20 percent, which is an unacceptable rate," said Dr. Malt, who is also Professor of Surgery at Harvard Medical School. "In the hands of people who have gained considerable experience in the method, the recurrence rate may be as low as five percent. We need a lot more follow-up, however, before we can really evaluate the technique."

In only one instance would an ul-

cerous condition be so severe as to require complete removal of a stomach. The condition, producing extreme gastric hyperacidity and atypical ulcers, is caused by Zollinger-Ellison syndrome, a malignancy of certain cells in the pancreas, or rarely the duodenum, that secrete gastrin.

To determine the presence and severity of an ulcer in the duodenum, a physician usually gathers sufficient evidence by conducting an "upper gastrointestinal (G.I.) series." These are X rays taken after the patient has swallowed barium, which outlines the digestive tract. Duodenal ulcers are almost always benign.

A gastric ulcer has a higher possibility of malignancy, and this status may prove more difficult to diagnose. The diagnostician may want to insert a flexible and lighted tube (gastroscope) into the stomach to inspect the disorder. He may also seek a laboratory analysis of tissue, obtained either through the tube or, more probably, from an exploratory operation.

If there is reason to believe from X ray alone that the ulcer is malignant, an operation will be recommended.

If a patient's ulcer is treated with medication alone, his diet instructions usually call for frequent small feedings and bland foods until he is back to normal, and then anything he wishes to eat with the understanding that he will avoid foods that tend to cause upsets. Coffee and alcoholic drinks, for example, have been shown to increase stomach acid.

Bland foods are not recommended for an ulcer patient following surgery because they may cause problems.

Dr. Goldfinger suggested a number of additional ways in which ulcer patients can help themselves:

"Identify areas of tension in your life and try to work them out. For some that may mean playing golf or tennis. Others may find a good book works wonders. Discuss your stresses; don't keep them wholly inside yourself. And, since even in the best of circumstances the possibility exists that an ulcer may recur, stay tuned for any early warning signals." ■

Photographs: Pages 1, 4 (upper), 5, courtesy of Massachusetts Audubon Society; p. 4 (lower), courtesy of Dr. Ann S. Baker; pp. 6, 7, courtesy of Dr. Raymond N. Kjellberg; p. 8, Myron Daniels.

Drawings: Page 3, courtesy of National Institutes of Health; p. 5, courtesy of Resident & Staff Physician.



Skunks account for more than half the cases of animal rabies in the United States.

Nearing Animals in the Wild Poses Risk

The great outdoors is beckoning again, and as millions of city dwellers plan their annual trek to commune with nature, some advice seems in order:

Keep a healthy distance from all animals living in the wild.

A half million Americans receive treatment for animal bites each year, and while domestic dogs and cats rank as the principal offenders, untamed creatures pose the greatest threat of inflicting serious diseases.

Although since 1968 only 15 humans are known to have been infected with rabies in the United States, an estimated 30,000 Americans undergo anti-rabies inoculations each year.

In most instances, the injections are purely precautionary since the animal that inflicts the bite usually escapes and cannot be examined.

Rabies is a virus which thrives in the saliva of an infected animal. Conveyed to a human via a bite, the virus enters the central nervous system, first

causing headache, fever, and general malaise, then confusion, muscle spasms, and paralysis.

Inoculations against rabies usually succeed because the disease has an incubation period of from 10 days to a full year.

In the past, if an infected person delayed being vaccinated until symptoms of the disease appeared, he was regarded as beyond chance of survival.

"This is not necessarily the case today," said Dr. Ann S. Baker, an MGH physician and member of the hospital's Infectious Disease Unit. "It's worth an all-out effort to treat the patient with all the cardiopulmonary support that one can provide."

Dr. Baker explained that a new anti-rabies vaccine (Human Diploid Cell Strain Vaccine) is 6 to 10 times more potent than the duck embryo vaccine used successfully against the malady since being licensed in 1957.

In place of a series of 21 or 22 pain-

ful injections administered over a two-week period, only a half dozen inoculations of the new vaccine assure full immunization. And the side effects, such as muscle pain and fever, are less severe.

Most cities in the United States have been declared rabies-free as the result of years of compulsory vaccination of domestic pets. In rural areas, however, if the biting animal cannot be caught and examined, two questions must be asked: Was the attack provoked? Has ownership of the offender been established? A negative reply to either question might warrant vaccinating the victim.

The federal Center for Disease Control in Atlanta, Ga., reports that in 1977, the latest year for which statistics are available, 3,130 animals in this country were found to be rabid.

Skunks accounted for 52 percent of the total, followed by bats, 20 percent; raccoons, 8 percent; cattle, 6 percent; foxes, 4 percent, and dogs, 3 percent. Miscellaneous other domestic or wild creatures completed the list.

In Massachusetts during 1977, 10 cases of animal rabies were reported, all involving bats, according to the State Laboratory Institute.

Dr. Baker, who is also Assistant Professor of Medicine at Harvard Medical School, said that all animal bites require very careful washing of the wound, but that suspected rabies calls for additional scrubbing of the site with soap and a brush, a careful rinse, then a repeat wash with alcohol to try to remove and kill the virus.

Gauze or some such cover may be put on the wound to keep dirt out, but no attempt should be made to sew up the wound, whether rabies is suspected or not, until a medical professional can examine and treat the injury.

Tourists and campers are advised to be on the alert for snakes. Between 6,000 and 7,000 poisonous snake bites are recorded each year in this country, the largest proportion occurring in southwestern and gulf states. Even areas like Massachusetts and Rhode Island, however, have rattlesnakes and copperheads. Most commonly treated are snake handlers, entertainers, farmers, and children.

The degree of toxicity from the bite depends on the potency of the venom, the amount injected, the size and condition of the snake, and the age, size, and health of the person attacked.

"As soon as possible after a limb is



One percent of the American population is allergic to the stings of insects such as this honey bee. Carrying an antivenom kit is a good precaution.

bitten, a tourniquet should be placed around the extremity above the wound to prevent the venom from traveling through the blood stream," said Dr. Baker. "However, the tourniquet should be loosened periodically to avoid impairment of the blood supply to the limb.

"Parallel cuts can also be made through the fang marks to give the poison a better chance to drain. A suctioning device is also helpful, but there should be no delay in reaching a hospital or clinic to receive an antidote to the poison."

Dr. Baker said that emergency rooms in urban medical centers should be prepared to treat the bite of the most common poisonous snakes.

Some years ago a 16-year-old boy was treated successfully at the MGH after being bitten by a cottonmouth, also called a water moccasin. A collector of reptiles, the youth had the cottonmouth shipped from a snake farm in Florida. In handling the pet, the boy mistakenly thought the snake had been defanged.

Spiders have a much worse reputation than they deserve. In the United States, the female black widow, which has an hourglass-shaped red mark on its abdomen, represents the greatest concern.

The bite of the aggressive black widow produces at the site a sharp pain which subsides, only to be followed by a cramping pain mainly in the abdomen. Patients usually do well after evaluation and treatment. Contrary to common belief, death is quite rare.

Public health officials caution travelers against handling wild rabbits because of a disease called tularemia, or rabbit fever. Several days after contact with the animal, symptoms of the disease appear in the form of headache, fever, lymph node swelling, and, at the site of the bite, a skin lesion. The disease also may be contracted by eating poorly cooked infected rabbit meat.

Ticks inhabiting the rabbit's fur can also transmit the disease to humans. In Massachusetts, most cases of tularemia are caused by these parasitic insects.

Ticks transmit another potentially deadly disease, Rocky Mountain Spotted Fever. Dr. Baker, who is also epidemiologist at the Massachusetts Eye and Ear Infirmary, said more cases of this malady occur along the eastern coast than in the Rocky Mountains.



The wildcat was aptly named. It is not an animal to trifle with.

"In recent years," she said, "we have seen an increasing incidence of the disease in the Cape Cod area."

Guarding against insect bites of all types during this time of year is important.

"One percent of our population is allergic to insect stings," Dr. Baker remarked. Some persons are subject to a kind of shock (anaphylactic) and can die from such stings.

"If a person is stung by a bee, wasp, or hornet and develops an unusually large area of skin redness, inflammation, or swelling around the bite, he should avail himself of kits containing anti-insect remedies," Dr. Baker said. "Many such kits are available commercially.

"Meantime, regardless of the insect, the stinger should be removed by scraping it off with a clean, dull blade and the wound cleaned. [Pulling out the stinger with thumb and forefinger could squeeze more venom into the wound.] Cold compresses should then be ap-

plied. If the victim does experience an allergic reaction, he should seek professional treatment."

Among household pets, principally cats, the most common bacterial infection transmitted to humans by means of bites is called *Pasturella multocida*. If the organism penetrates deeply, an inflammation of the bone (osteomyelitis) can result.

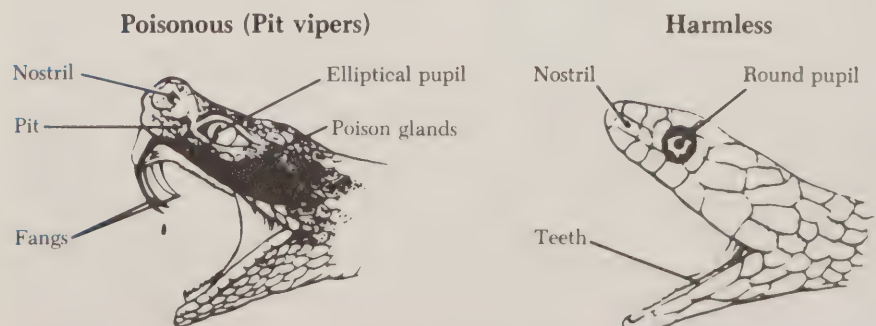
"One would prescribe penicillin if the bite were inflicted by a cat," Dr. Baker said, "because a feline usually possesses longer and sharper teeth than a dog. Also, the organism isn't quite as prevalent in the dog's mouth. In tending to dog bites, it is usually sufficient to clean the wound and leave it open."

The second most common concern among cat owners, especially those having kittens, is an ailment called cat scratch disease. The cause is uncertain, but the scratch may lead to a skin lump, fever, lymph node swelling, and general malaise. The victim eventually recovers without treatment.

In general, to avoid infections transmitted by animals, Dr. Baker recommends:

- Do not try to play with animals in the wild or to capture them as pets.
- If bitten without provocation by an animal whose ownership cannot be established, seek immediate medical care.
- When traveling in an area where snakes or insects abound, carry an appropriate antivenom kit and wear protective clothing.
- Do not tease animals, especially if they are caged or tethered.
- Make sure pets are properly immunized.
- And after fondling pets of any kind, be sure to wash your hands. ■

Ways to Differentiate Poisonous From Harmless Snakes





Stereotactic frame holds patient's head rigid so cyclotron can direct proton beams at target in brain.

Proton Therapy Cuts Stress for Patient

(Continued from Page 1)

and gradually obliterating 95 percent of it during subsequent months. Her condition also at that point became operable, permitting the cutting out of the remaining five percent.

Proton beam radiation differs in many respects from a more familiar type of radiation, the X ray. Whereas X rays consist of waves of energy, protons are particles somewhat akin to pellets too small to see even in a microscope. The proton has mass, which allows it to be "shot," and a positive electric charge, which permits the cyclotron to accelerate the beam to extremely high speeds.

With the patient's head held rigid in a special stereotactic frame, successive proton beams are fired at the AVM from opposite sides of the skull. By rotating the patient in the cyclotron, Dr. Kjellberg can focus more beams at the target through tissue previously unexposed to the radiation.

Precise mathematical calculations allow the proton to travel only as far as the diseased region and on reaching that point the particle emits an extra burst of energy. Physicists refer to this as the "Bragg Peak."

The stereotactic procedure does not require any openings in the skull or even a shaving of the patient's head.

Following treatment, the patient returns to the hospital where he or she may have spent four or five days preparing for the radiosurgery. After a stay of one posttreatment night, the individual can go home. Immediate resumption of work and other normal

activities can take place.

Besides subjecting the patient to less stress than open (conventional) surgery, the proton beam route generally costs him substantially less money because of a shortened hospitalization.

Using the cyclotron, Dr. Kjellberg has treated AVMs in more than 100 persons ranging in age from 15 to 50 years. Their conditions either made open surgery impossible or posed a risk out of proportion to any potential benefit.

Nearly three quarters of the patients underwent treatment during the past two years. Since evaluation of their care cannot be made until substantial time has elapsed, meaningful statistics are available on only the 27 individuals treated earlier. Like all who have undergone the treatment, they were otherwise incurable or too much of a risk for conventional surgery.

Follow-up angiograms (special X rays that show blood vessels) demonstrated AVM improvement in virtually every instance, although in a number of cases the improvement was slight. In four individuals the malformation was either gone or nearly so after the radiosurgery. A marked reduction of the mass occurred in seven patients. Among 11 persons who had suffered pretreatment seizures, six enjoyed total relief, and the remainder reported a reduction in either frequency or severity of their attacks.

Neurologic function among the 27 patients worsened in four instances, making it clear that proton beam treatment does carry risk. Following these

episodes, the treatment methods have been altered to minimize any future problems.

Neurologists and neurosurgeons generally regard most AVMs as embryonic blood vessels which simply failed to mature. People can have the condition for years without being aware of it. About 500 cases come to medical attention annually in the United States. Only half are correctable in the operating room.

Ninety percent of AVMs present themselves in one of two ways:

The vessels may rupture, sending blood through areas of the brain. Headaches or temporary loss of consciousness may signal the impending hemorrhage, or stroke, which can often prove fatal.

The AVMs may also make their presence known by causing seizures, usually affecting certain areas of the body at first, then moving to different parts.

A variety of other symptoms, such as physical weakness or memory loss, account for the remaining disorders.

The neurologic problems stem from a number of factors. Blood flow through the AVM may be so great that blood is drawn away from other major brain vessels. The mere presence of the mass in an area which, for example, controls limb movements may interfere with limb use. And a weakness often can be attributed to the fact that a vessel bled at one time, knocking out a certain volume of brain tissue.

"The standard and most commonly advocated method of treating AVMs is surgical excision," said Dr. Kjellberg, who is also Associate Clinical Professor of Surgery at Harvard Medical School. "Now that the operating microscope has come into wide use, the capability of getting good results from open surgery has vastly improved."

He stressed, however, that for a patient to be considered suitable for such a procedure, the malformation must be comparatively close to the surface of the brain.

"If the AVM were deep within the brain, the excision would have to penetrate considerable normal tissue, and that alone could cause injury," he pointed out.

"Also, surgeons often hesitate to excise AVMs on the left side of the brain because of risk that the operation might adversely affect areas governing the patient's speech."

Some of the perils associated with

Hypnosis Enhances Defense Against Pain

Some people can do remarkable things when they put their minds to it.

"The pain is there. I know it is, but I just don't feel it," exclaimed a middle-aged man one day after a periodic outpatient visit to the MGH.

He might have been one of an estimated 15 million Americans dependent upon drugs for the relief of nagging pain, but he was not. He had gone that route to try to overcome neck pain caused by an arthritic condition. Nothing worked. Then he turned to hypnosis.

As a consequence of his newest therapy, he is free of both medication and distress. Not only has he learned how to relax but hypnotic suggestion has also enabled him to maximize his use of inherent coping abilities.

Practiced since ancient times, hypnosis has drawn more attention in the medical field in the past two decades than ever before. The technique is taught in medical schools and employed in patient care by thousands of physicians and dentists.

At the MGH, pain relief has been a special interest of the Hypnosis and Psychosomatic Unit since its establishment by the hospital's Psychiatric Service in July of 1975.

"Pain is one of the primary reasons why people come to medical centers," said Dr. Owen S. Surman, an MGH psychiatrist and member of the Unit. "Acute pain can be treated with narcotics, but ways of dealing with chronic discomfort are not always that clear-cut. Sometimes the diagnosis itself is

uncertain."

Hypnosis poses no risks when performed by a properly trained therapist. However, the suggestibility of the patient is indispensable to the success of the treatment.

Dr. Surman estimated that only 1 person in 5 with pain would benefit significantly from hypnosis and only half of that 20 percent would enjoy complete relief.

The good hypnotic subject must have fine powers of concentration since the tuning in on one idea to the exclusion of all others is the basic difference between hypnosis and simple relaxation. The ideal candidate, for example, could be conditioned to listen undisturbed to a symphony even as dive bombers roar outside.

Have you ever watched a play or
(Concluded on Page 8)

conventional surgery do not apply to proton beam treatment. Besides eliminating the need for general anesthesia and cutting, the therapy cannot cause an infection or hemorrhage.

Dr. Kjellberg emphasized, however, that people vary in their reaction to radiation. "The same size dose may affect one patient one way and another person somewhat differently," he said. "So this is not a risk-free procedure.

"We also radiate at different doses depending on the intended effect. The size of the AVM helps to determine this."

There are potentially serious side effects in some instances when complications occur because of the proton beam treatment. However, the benefits that might accrue outweigh the risks since there is no alternative treatment.

Similar efforts to treat AVMs with a single sitting are under way in Sweden but with the use of a different type of machine.

There are reports that some other forms of radiation are somewhat effective, but the beams cannot be focused as precisely as those used by Dr. Kjellberg.

The staff of Harvard's Cyclotron Laboratory provides valuable technical assistance to the MGH medical team in making precise calculations. The lab's retired Director, Dr. William Preston, and its present Acting Director, Andreas Koehler, were intimately involved in converting the navy-built research equipment to medical use some 20 years ago.

When Dr. Kjellberg discharges a patient after proton beam treatment for an AVM, he makes only two requests: Avoid body contact sports which might cause a striking of the head and avoid weight-lifting which might strain the abdomen and trigger a rise in venous blood pressure.

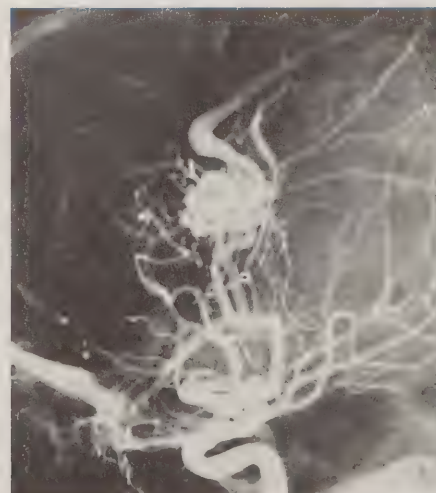
Patients also are informed that two years after treatment they must undergo a CT (computerized tomography) scan and angiography to evaluate their condition. The results might call for follow-up treatment.

In addition to working with Dr. Adams to treat AVMs, Dr. Kjellberg has used the Harvard cyclotron to care for more than 1,000 patients with pituitary-related problems (MGH News,

November 1969 and March 1973). Dr. Bernard Kliman, an MGH endocrinologist, collaborates in this work.

Dr. Kjellberg also has been treating a limited number of patients for brain tumors such as acoustic neuromas, craniopharyngiomas, and meningiomas, all difficult to reach with conventional means.

Dr. Kjellberg commented that "in these days when new technology is often immensely expensive, it is refreshing that people can be offered a therapy combining reasonable effectiveness, comparatively low risk, minimized periods in the hospital, and negligible convalescence, and frequently at a cost lower than alternatives, when alternatives exist." ■



At left, a large, round mass of tangled, malformed blood vessels in the brain of a 15-year-old girl. At right, the vessels 95 percent corrected by proton beam therapy.

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Hypnosis Requires Trust in Therapist

(Concluded from Page 7)

movie and identified so closely with the actor on stage or film that for a few moments you forgot where you were? If so, that knack could label you as a potentially suitable hypnotic subject.

A policeman races up a flight of stairs and captures a gunman who had been spraying bullets from a window. Asked if he had been afraid, the officer answers, "No, I knew I had to get that guy." Another good candidate for hypnosis.

Almost all children are hypnotizable before the age of puberty. With pre-talking youngsters, the therapist might have to resort to a light caressing movement, but once the children begin to talk and listen to stories, their attention can be captured readily.

Hypnosis requires the patient's total trust. The therapist must explain fully at the outset what he plans to do and what reaction he expects.

The responsiveness to suggestion among hypnotized patients varies.

At one extreme a woman hypnotized for relief of back pain developed such an ability to anesthetize herself that one day at home she accidentally

burned her hand on an iron and did not become aware of the mishap until some time later. Blotting out pain that completely is very unusual and also potentially unsafe.

Another patient had back pain so severe he was unable to sit down at the dinner table with his family. Hypnosis improved his condition sufficiently so that he could join his family at mealtime and keep busy in his home workshop. His dysfunction, however, remained serious enough to prevent him from returning to his regular occupation.

When attempts at hypnosis fail, Dr. Surman looks for another approach to the patient's problem. The Hypnosis and Psychosomatic Unit offers other rehabilitative procedures (such as bio-feedback and behavior therapy) on an outpatient basis.

Members of the Unit staff, directed by Dr. David V. Sheehan, sometimes act as a team in caring for a patient. In addition to Drs. Sheehan and Surman, psychiatrists on the staff include Drs. Theo C. Manschreck and Nicholas D. Kouretas. Two psychologists, William E. Minichiello, Ph.D., and Edward Harpin, Ph.D., also are members.

Patients who seek hypnotherapy complain of discomfort from any one of a number of disorders, i.e. musculoskeletal, gastrointestinal, or neurological. More often than not, they have already tried drugs, and they may have undergone surgery more than once.

Dr. Surman and his colleagues believe that the mind has an impact upon health and that with some people "we can harness the impact to treat not only pain but also anxiety, insomnia, sexual dysfunctions, and a host of other conditions."

Hypnosis also has proved effective against pain by inducing a person to alter a self-harmful point of view. Some people use their imagination destructively without realizing it.

Dr. Surman, who is an Instructor in Psychiatry at Harvard Medical School, explained that if an individual has a pain in his hand and also possesses a keen imagination he may decide that his hand is useless or that he cannot use it without the help of a certain drug.

"That conviction is very potent," the doctor stated. "With hypnosis, we strive to relax the patient and persuade him to turn his negative feelings into positive ones."

Hypnosis can cause as well as eliminate pain. It is known that by telling a person in a trance that he will be touched with a hot iron but then actually using an eraser, the subject will raise a blister on the spot touched.

At times, members of the MGH Psychiatric Consultation Service are asked by staff physicians to hypnotize hospitalized patients suffering from unexplained pain or discomfort. The Hypnosis and Psychosomatic Unit stands ready to continue the support service after discharge.

In lectures that he gives on the subject, Dr. Thomas P. Hackett, MGH Chief of Psychiatry, has commented:

"If you can use hypnosis to relieve pain, you have another effective tool in patient care." ■



At the suggestion of the therapist, patient's right arm seemingly becomes weightless, showing he is in hypnotic state.



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Baby With Unusual Malady Receives Special Care

Repairing Congenital Defects of the Hand

From time immemorial people have been sensitive about their appearance. They pay meticulous attention to their head, face, and hands—parts of the body that are always visible.

Each year, however, thousands of babies enter the world with some deformity involving one of those anatomical structures. If mild, a disfigurement of the head or face may cause a child less concern than expected as he grows older. Inasmuch as he cannot see the defect unless he peers into a mirror, he may not fret about it.

His hands are another matter. With an abnormal hand that is visible not only to others but to himself as well, the child may develop feelings of frustration. Left untreated, a hand deformity can cause permanent emotional scars.

"As a baby develops, he becomes increasingly conscious of his hands during play," said Dr. Richard J. Smith, Chief of Hand Surgery in the MGH Orthopaedic Service. "If a child has an abnormal hand, it won't be long before he realizes that it is different from others, and he may try to keep it from sight."

Dr. Smith recalled a baby who was born with eight fingers on one hand. "The parents were so ashamed," he said, "that they constantly hid his hand in a mitten. Fortunately, we saw the

baby early. At the age of 6 months the extra fingers were removed and the hand corrected. The child is now about 5 years old, uses the hand well, and considers it perfectly normal."

An estimated 5,000 infants are born in the United States annually with some type of abnormality affecting the hand or forearm. Ten percent of the defects involve absence of part of a limb.

Last February, Dr. Smith and Dr. Robert W. Lipke, a former Fellow on the MGH Hand Surgery Service, co-authored two articles in the *New England Journal of Medicine* on the

(Continued on Page 4)



Eight-year-old Kevin Dupont, under MGH treatment for acute lymphocytic leukemia, turns the tables on his physician, Dr. John T. Truman. (Story on page 6)

As might be expected in January, far north on the rockbound coast of Maine, the temperature hovered around freezing. On the radio, a forecaster warned of an impending ice storm. Nevertheless, more than 30 people flocked to the fire station in tiny, snow-covered West Jonesport to hear John Thompson and Nancy Encke.

Three-month-old Leo Chandler III, son of a lobsterman in the town of 400, had just been discharged from the MGH after treatment for a rare, life-threatening, breathing disorder. Mr. Thompson, a respiratory therapist at the hospital, and Miss Encke, a staff nurse in its Newborn Intensive Care Unit, accompanied Leo home.

Since the baby's survival depended upon continued use of a respirator when he slept, the MGH personnel delivered the necessary equipment. They next alerted local firefighters and emergency medical technicians to Leo's plight.

His malady bears the technical name, "Congenital Central Hypoventilation Syndrome." To the dismay of physicians, some people refer to the illness as "Ondine's Curse."

Ondine was a water nymph in mythology who put a hex on an ex-suitor, telling him his automatic body functions would continue only at his personal command. Unable to sleep for fear his breathing would stop, he eventually died from lack of rest.

"The term 'curse' is hardly one that we can warm up to," said Dr. Daniel C. Shannon, Director of Pulmonary Research in the MGH Children's Service. "Often when people put a label on something before they fully understand

This issue of the *MGH News* is dedicated to the International Year of the Child.

(Continued on Page 2)



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AN EDITORIAL:

The Day of the Child

The United Nations has called 1979 the International Year of the Child. Focusing attention on children for a year makes sense—perhaps. Just so long as the spotlight does not grow dim on midnight of December 31.

The importance, of course, is that children are our future. Many of the mistakes that we have made stand out like a California Redwood in the Sahara Desert. Obvious to see, but useful as guidelines only to citizens intelligent and caring enough to seek a better world. Even if we produce a nation of Einsteins, though, they will achieve little unless they live to maturity and unless they are healthy enough to maximize their intelligence.

That means our children need to learn good self-care by self-discipline in areas such as balanced and adequate diets, avoidance of a life-impairing habit like smoking, and appropriate treatment when illness strikes.

When the problem is serious enough to require hospitalization, the treatment should be of high quality. Particularly with children, the psychological component of care is also critical. A youngster frightened by his hospital experience can bear the resulting psychological scars for life. His parents' participation in forming a healthy attitude is essential.

In recognition of these factors the MGH Children's Service has long carried out a program that:

- Holds preadmission orientation to help the child and parents adjust before admission.
- Suggests that parents remain with their hospitalized children even 24 hours a day when possible.
- Encourages nurses and parents to cuddle sick infants as much as possible to provide the love, warmth, and contact on which even newborns thrive. Organized a group of foster grandparents for children whose parents can seldom visit.
- Aims at daily telephone calls to parents and sends photographs of the infants to those parents unable to visit regularly.
- Provides a well-trained, closely knit team of caretakers who cut across a variety of specialties of physicians, nurses, and other allied health professionals.
- Has a primary care nurse who is assigned specific children.
- Makes it possible for most parents to hold the hands of their young children being put to sleep in preinduction anesthesia areas.
- Has recreational programs for the children.
- Makes it possible for hospitalized youngsters to keep up with their school-work. (Teachers are assigned by the Boston School Department.)
- Conducts one of the few centers in the world for a major form of Sudden Infant Death Syndrome.

Yes, the International Year of the Child is an excellent starting point. Let's use it as a reminder to make every day of every year the day of the child.

Special MGH Team Alerts Maine Town To Needs of Infant

(Continued from Page 1)

it, they only hinder efforts to really get at the root of the problem."

While the patient is awake, the illness causes no untoward effects. During sleep, however, his breathing pattern becomes very shallow. For some unknown reason, he gets insufficient oxygen (O) and retains too much carbon dioxide (CO₂).

The chronic strain of low levels of O and high concentrations of CO₂ leads to heart failure, sometimes even before awareness that a breathing irregularity exists.

Medical journals have described the central hypoventilation syndrome in just a handful of infants, but Dr. Shannon believes that many babies whose deaths were attributed to "Sudden Infant Death Syndrome" actually have succumbed from a similar respiratory imbalance.

Leo Chandler was only the fifth child with his particular breathing difficulty to be diagnosed and treated at the MGH. Since doctors could offer only stopgap measures to deal with the illness, Mr. Thompson and Miss Encke were sent to northern Maine to ensure proper postdischarge attention for the baby.

"Mr. and Mrs. Chandler spent a week at the MGH learning how to operate the respirator and the other equipment," Mr. Thompson explained, "but in the event of an emergency others had to be prepared to render assistance."

If power to the Chandler's ranch-style home failed, firefighters would have to hook up an emergency generator.

The usual method of applying cardiopulmonary resuscitation would have to be revised slightly for Leo. Since a surgeon had made an opening (tracheostomy) in the baby's windpipe to permit use of the ventilator, attempts to restore breathing through mouth-to-mouth stimulation would first require blocking the surgical opening.

Photographs: Pages 1, 5 (lower), 6, 7, 8, Myron Daniels; p. 3 (upper), John Thompson; pp. 3 (lower), 4 (lower), Nancy Encke; pp. 4 (upper), 5 (upper), Dr. Richard J. Smith.

If a crisis arose demanding quick hospital care, an ambulance crew had to rush Leo 60 miles south to the nearest medical center at Ellsworth, Me.

While taking Leo home, by plane to Bar Harbor and then over the road, Mr. Thompson and Miss Encke stopped overnight at Ellsworth Hospital to acquaint physicians and nurses with the child's difficulty.

The MGH team later spent three days in West Jonesport observing his home care and making sure that everyone in the town who needed to know about the child's condition had been informed. Then, fighting an ice storm, the team returned to Boston.

Leo will be 2 years old next month. He is doing well but still sleeps with the assistance of the respirator.

Of the five babies diagnosed with the hypoventilation malady at the MGH, one died at 6 months of age from an unrelated lung infection. All of the others, ranging up to 7 years of age, are progressing nicely, although relying on some kind of breathing support.

An MGH questionnaire sent to a number of medical centers by Dr. Shannon and by Dr. Carl Hunt of Children's Memorial Hospital, Chicago, produced histories of 27 other babies with the same symptoms as the MGH patients. This is almost certainly an underestimate of the total born with the condition.

About one third of the 27 failed to survive, generally because of failure of the life support system. Those who are not recognized probably die in infancy.

The strange illness first came to light among adults some 20 years ago. Those affected reported it sometimes took them hours to fully awaken after a

night's sleep.

"They were in jeopardy on several counts," said Dr. Shannon. "As a result of improper breathing, they developed hypoxia [deficiency of oxygen reaching bodily tissues]. Meantime, the rising CO₂ had a narcotizing effect which depressed the breathing even further.

"Many patients complained of awakening with severe headaches. This could be attributed in part to the CO₂ since the gas tends to dilate blood vessels in the brain, allowing the presence of more blood than usual. Whenever you increase the volume in a fixed compartment, such as the brain, pressure builds up."

Once awake, the patients could stabilize their breathing, dispose of the excess carbon dioxide, and restore normal brain pressure. They then felt fine.

Treatment for the respiratory disorder often involved awakening the patient periodically during the night and having him take deep breaths. Various pharmacologic stimulants were tried, but they provided no help.

In the mid 1960s, while doing pulmonary research at the MGH, Dr. Shannon began to wonder whether the malady found in adults also affected infants. One baby, described at Columbia Presbyterian Medical Center in New York City, seemed to fit the pattern but died at 6 months of age.

In 1972, Dr. Shannon's attention was directed to a baby who turned blue and stopped breathing in the delivery room of a suburban Boston hospital. Brought to the MGH, the infant exhibited all the signs of congenital central hypoventilation.

"Her breath size and frequency of breathing were normal when she was



Aboard an airplane flying Leo Chandler back to Maine from Boston, Miss Nancy Encke, RN, operates a portable device which supports the baby's breathing.

awake," the doctor said, "but when she fell asleep, the volume of each breath fell by a third of the normal value."

After lengthy observation made it apparent that the baby had a long-term problem, a negative pressure respirator (iron lung), originally designed for polio-stricken infants, was obtained.

This device soon proved inadequate, however, and a tracheostomy was made. The child's parents learned how to use a positive pressure respirator in conjunction with the tracheostomy.

Now 7, the patient resides in the Boston suburb of Somerville, attends public school, and, except for sleeping with the aid of a mechanical breathing device, lives a normal life.

What does the future hold for this child, and others subsequently diagnosed with the same illness? Will they always need a breathing assist?

No one can say, but one 2½-year-old former MGH patient, living in Chicago and cared for by Dr. Hunt, is getting along fine without a respirator. His breathing is aided by an electrophrenic pacemaker, similar to a cardiac pacemaker.

Implanted on the phrenic nerve which is associated with the diaphragm, the instrument sends impulses down the nerve, mimicking what the brain does to make the diaphragm contract and move air in and out of the lungs.

Dr. Shannon, an Associate Professor of Pediatrics at both Harvard Medical School and the Harvard-Massachusetts Institute of Technology School of

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At his home in West Jonesport, Leo sleeps soundly, protected by a respirator.



The development before birth of two thumbs on one hand (left photo) could have inflicted severe psychological scars on the young patient if surgery had not normalized the hand (right photo).

Nature of Hand Defect Sets Surgery Time

(Continued from Page 1)

treatment of congenital hand and forearm deformities. Dr. Lipke now practices in Denver as a specialist in hand surgery.

Extra fingers constitute one of the most common malformations. "We will not operate until the family pediatrician feels that the infant can safely undergo general anesthesia," Dr. Smith remarked. "Often an extra finger can be removed in a surgical day care unit. The parents may be able to take the baby home several hours after the surgery."

Dr. Smith emphasized, however, that corrective work to provide the usual number of fingers can be very complex. An extra finger may share a joint with a normal one, and simply removing the

abnormal digit can cause the finger that remains to become unstable. The joint itself also may require some reconstruction.

Having more than the normal number of fingers (polydactyly) is usually hereditary. Studies have shown that the condition appears more often among blacks than whites.

Also generally considered to be inherited is the next most common birth defect, webbed fingers (syndactyly).

Dr. Smith said that the webbing may extend all the way from the base of the fingers to the tip.

"Simply cutting the web would leave a scar which would gradually cause the fingers to contract or curl," he stated. "So skin grafts are almost always necessary. Frequently, we also find a

common nerve in the web. Such a nerve must be split in order to assure sensation in each finger."

When to schedule hand surgery depends upon the condition being treated, but whenever possible doctors strive to complete the work by the time the patient reaches school age.

They put off most procedures until the child is at least 6 months old. In situations requiring postoperative cooperation of the patient, the surgeon may wait until the youngster is 2 or 3 years old, sometimes even older.

Emergencies do arise. On occasion, a baby is born with portions of the birth sac wrapped around his fingers. Because of the threat of gangrene, surgery must be performed within 24 hours to relieve the pressure and swelling, and to restore normal circulation.

Another condition requiring early attention after birth is the radial clubhand. This deformity results when the radius, or thumbside bone of the forearm, is absent or develops only partially. With the wrist unsupported, the hand falls into a distorted, club-shaped position.

"In dealing with a clubhand," Dr. Smith said, "we like to apply casts within the first week of life to prevent tissues from becoming too contracted. Surgery to place and stabilize the wrist and hand at the end of the ulna, the other bone of the forearm, can then wait until the child is a year old.

"Failure to carry out the preliminary measures might later jeopardize the success of the surgery and necessitate extra operations."

Frequently, underdevelopment or absence of the thumb accompanies ab-

Breathing Disorder

(Concluded from Page 3)

Health Sciences, said the electrophrenic pacemaker can be installed in a baby as young as six months.

To avoid the possibility of damaging the phrenic nerve, however, he feels the best procedure would be to employ a respirator while the child is relatively young and switch later to the pacemaker.

Although still relying on a man-made apparatus to sustain life, the child could enjoy many more freedoms with the pacemaker, including for the first time so simple a pleasure as being able to sleep over at a friend's house. ■



Meeting with firefighters and medical technicians in the West Jonesport fire station, MGH Respiratory Therapist John Thompson (right), describes Leo Chandler's unusual illness and what assistance he might need in an emergency.



Photo at left shows a child's hands with five fingers on each hand and no thumbs. At right, the extra fingers have been made into thumbs.

sence of a radius. The surgeon often will transfer the index finger to serve as a substitute thumb.

After being shifted to the thumb position, the finger is rotated to oppose the other fingers. The new thumb is then shortened by removal of part of one bone. Muscles and tendons also must be shortened.

Dr. Smith, who is Associate Clinical Professor of Orthopedic Surgery at Harvard Medical School, said the index finger moves well and has normal sensation in its new role.

In recent years, medical journals have reported at least five cases in which big toes were transplanted to serve as thumbs for patients born without them. About three years ago, Dr. Smith and Dr. James W. May, Jr., an MGH plastic surgeon, performed two such transplantations on the same individual, a 10-year-old boy.

Would the brain recognize the toe as a thumb? After all, this was not like repositioning a finger whose control by the brain was never severed, only redirected.

"All I can say is that the transplantation does work," Dr. Smith remarked. "If we touched the boy's new thumbs with a pin or a wisp of cotton and asked him what he felt, he would promptly answer, 'A sensation in my thumb.'"

"He began to use his thumbs rather rapidly after his surgery. In fact, we often saw him holding a cue stick with his new thumbs while he played pool in the pediatric unit."

Sometimes, birth defects of the hand take the form of excessively short or long fingers or thumbs.

To lengthen a digit, a bone near the base is cut in two and a thin, stainless-steel wire is inserted across each bone section. A small, metal lengthening device is attached to each end of the parallel wires. Each day, the device is lengthened to widen the bone separation by an additional millimeter (1/25th of an inch).

The procedure occurs so slowly that it is painless. The child remains in the hospital for the first day or two. Then the family takes over at home. After the distraction device completes its job, the space between the separated bones is filled with a small bone graft, usually taken from the child's pelvis.

Surgeons customarily postpone the lengthening process until the patient is 4 or 5 years old to ensure proper composition of the bone for fusing.

Shortening an overly large finger is a complicated procedure because the surgeon must at the same time thin the digit. For shortening, some bone must

be removed crosswise. For narrowing, the inner core of other bone is taken out and the sides are compressed. Excessive skin, soft tissue, and fat are removed in multiple stages.

Dr. Smith said that if the patient is seen early enough "we can predict how long the finger should be when the child reaches maturity and stop the finger from growing when the appropriate length is attained." This can be accomplished by surgically closing the growth plates (epiphyses) at the ends of the finger bones.

In cases of severe deformities, Dr. Smith tells parents at the outset that while reconstructive surgery can improve the function and appearance of a hand, it can never be fully normal.

"It is absolutely essential," he stressed, "that parents—and the patient if he's old enough—fully understand the realities of the situation."

Dr. Smith has discovered that chil-

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Chan Wah Chee of Hong Kong visits his 16-year-old son, Eric, who underwent surgery at the MGH to repair a clubhand. An avid swimmer despite his handicap, Eric cannot wait to get back into competition.

Winning the Struggle To Save Children From Leukemia

When Denise Hahn of Pelham, N.H., was 9 months old, doctors doubted that she would live much longer.

Mr. and Mrs. Peter Hahn had brought Denise to the MGH for a battery of tests, hoping to learn why their daughter's head had become disproportionately large.

The tests disclosed that the baby had developed acute lymphocytic leukemia, a cancer of blood-forming organs that causes a form of protective white cells called lymphocytes to multiply abnormally.

The cancerous cells had spread from her blood to the brain, producing the unusual head growth called macrocephaly.

Unless preventive steps are taken, central nervous system (CNS) involvement occurs in 70 percent of children with leukemia, but the complication is rarely encountered at the start of the disease and in a patient who is only months old.

"We informed Mr. and Mrs. Hahn that because of the advanced state of Denise's disease, we felt she had only a 1 percent chance of surviving," said Dr. John T. Truman, MGH Chief of Pediatric Hematology. "Nevertheless, we asked for permission to begin aggressive treatment. The Hahns gave

Denise Hahn, former leukemia victim shown undergoing a checkup by Dr. John T. Truman, has been off chemotherapy for five years.



their wholehearted support."

In addition to standard chemotherapy (drug treatment) to combat the child's general leukemic condition, Dr. Truman injected the anticancer drug methotrexate into her spinal fluid and requested radiation therapy for her brain to try to kill the cells that were causing the macrocephaly.

Despite the overwhelming odds against her, Denise responded to the treatment. She gradually overcame the leukemia. Meantime, her head stopped growing until her body size could catch up. Then her development followed a

normal course.

Today Denise is a healthy, happy, attractive, 8½-year-old, who has required no treatment since 1974. She attends public school and engages in all of the activities expected of a youngster her age.

Fifteen years ago, the odds of a child surviving leukemia, even without CNS involvement, were zero. The disease primarily befell children ranging in age from 2 to 6 years. Death followed between 6 and 18 months later.

The outlook for recovery from acute lymphocytic leukemia, the most com-

Hand Surgery

(Concluded from Page 5)

dren with deformities of the hand will try to accomplish the most difficult tasks manually, and some do amazingly well.

He told of a teen-aged patient with severe deformities of both hands who was determined to play the organ. Following surgery to straighten a clubhand, the young man went on to achieve his ambition.

Not all of Dr. Smith's patients set such difficult goals, however. Remember the 10-year-old whose toes became his thumbs? Asked why he wanted thumbs, he gave three reasons:

"I want to be able to hitchhike. . . .

"I want to be able to snap my fingers. . . .

"And I want to be able to hitch up my pants and make like the Fonz." ■

Parents Ask: Why Our Child?

When a child is born with a deformity, two questions cross the parents' minds: Did they do something to cause the defect? Is the condition hereditary?

To the first question, referring to possible external influences, the answer almost always is "no," according to Dr. Lewis B. Holmes of the Genetics Unit in the MGH Children's Service.

Responding to the second query, he said, is more difficult. Parents may thoroughly probe the background of their respective families for evidence of an inherited disorder and find nothing. Yet their child's condition may well be hereditary; he may simply be the first affected member of the family.

"This is where the geneticist comes in," said Dr. Holmes. "Through a

careful diagnostic evaluation of the child, the specialist can either rule out heredity as a factor in the youngster's deformity or confirm the condition as familial and determine how it might occur again."

A study of a child with a clubhand, for example, might turn up associated disorders which together form a pattern seen in many well-documented cases of heredity.

"This particular genetic mold might include subtle abnormalities of the face, such as clefts of the eyelid, missing eyelashes, or mild ear defects," Dr. Holmes explained.

The MGH Genetics Unit has several reference books on all known hereditary malformations involving the hand and arm. ■

mon form of the disease in childhood, has changed considerably. Utter despair has been replaced by feelings of genuine optimism.

Of 49 children treated for the disorder at the MGH during the past eight years, 69 percent are alive today and free of disease.

Physicians who once could offer no hope and later began to speak of long-term remissions now in many cases confidently talk about cures.

The picture began to brighten in the late 1960s as a result of a number of studies, including major work carried out at St. Jude Children's Research Hospital in Memphis, Tenn.

After injecting methotrexate into the spinal fluid of patients and giving radiation therapy to the brain to protect the central nervous system, physicians noticed a dramatic rise in the children's length of survival.

At just about the same time, the fight against the blood cancer took still another giant step forward.

The standard practice in treating acute lymphocytic leukemia was to use a single anticancer drug, then substitute another when the preceding one lost its effectiveness. Eventually the arsenal emptied.

The multicenter research led to a new treatment format, one that proved so successful it remains in universal use today.

The idea was simple. Instead of administering the anticancer medications sequentially, give them simultaneously. Investigators found that the drugs complemented each other and the combination provided a much more potent and lasting effect upon the

Mrs. Monica Corrigan, RN, prepares one of a series of injections required for the treatment of leukemia. After about eight weeks, the chemotherapy can be maintained with pills.



disease.

The therapy called for prednisone, vincristine, 6-mercaptopurine, methotrexate, and cyclophosphamide. At the MGH, the latter drug has been dropped in favor of asparaginase.

The initial, and most intensive, phase of the treatment lasts eight weeks. During that time, the patient receives a series of intravenous and spinal injections, most of them once a week for four or six weeks. An exception, asparaginase, is administered intravenously each day for 10 days. The patient usually can be maintained on the program thereafter with pills.

"The average patient faces about seven days of hospitalization when treatment begins," said Dr. Truman, "and then therapy continues on an outpatient basis. During the next three years the child may spend five days a year in the hospital as a consequence

of a low blood count, an infection, or some other complication. Aside from that, school is rarely missed. The child's appearance and energy level are so close to normal that it is virtually impossible to distinguish a leukemic child from others playing in the schoolyard.

"Fifteen years ago, leukemia patients spent more than 100 days in the hospital, and there was no hope at all then of being saved."

While receiving injections is not a pleasant experience, especially for the very young, it is nowhere nearly as bad as might be supposed.

"When the children first come in to begin treatment, they are usually not feeling well," said Miss Genevieve Foley, RN, a pediatric nurse clinician who works directly with MGH cancer patients. "Some of the youngsters complain of bone pain, or a limp, or black and blue marks. Most of the distress at the beginning is caused by the disease, not by the treatment.

"Often that pain will vanish as soon as the first injections are given. The discomfort that comes afterward is really more tolerable."

The discomfort caused by the treatment may include stomach cramps, but they subside as soon as the drug dosages are decreased. Hair loss may also take place, but this, too, is temporary.

While cures are becoming common in acute lymphocytic leukemia, Dr. Truman, an Assistant Professor of Pediatrics at Harvard Medical School, emphasized that the battle is not being

Close friendships often develop between young leukemia patients and those responsible for their care, as evidenced here by 9-year-old David Terry, who has overcome the disease, and Miss Genevieve Foley, RN.



(Concluded on Page 8)



Leukemia Takes More Than One Form

(Concluded from Page 7)

waged against a single enemy.

Eighty to 90 percent of children stricken with leukemia have the lymphocytic type. Although leukemia takes several forms, most other youngsters develop a much more insidious type called acute myelocytic leukemia. This is a disease of another white cell called a polymorphonuclear neutrophil.

"Lymphocytes help us counter such problems as viral infections, fungal infections, and transplant rejections, but we can get along without these cells for a little while," Dr. Truman said. "We cannot do without the 'polys.' They protect against bacteria, and we live in a veritable sea of bacteria."

Although four of eight children treated for acute myelocytic leukemia at the MGH during the past eight years are alive and disease-free, survival expectancy from this malady is much lower than that of its lymphocytic counterpart.

Dr. Truman said that myelocytic leukemia is treated with cytosine ara-

binoside and adriamycin, drugs which are difficult for patients to take.

"The medications have to be administered in the hospital," he stated, "because they're much more toxic to the patient, often causing nausea and vomiting."

Leukemia in adults is quite different. Eighty to 90 percent of adult patients have acute myelocytic, and 10 to 20 percent acute lymphocytic, a ratio just opposite that of the childhood leukemias. Long-term survivals among adult victims of either of these two types number only about five percent, a much bleaker picture than the one representing children.

About 1,500 cases of childhood leukemia are diagnosed in the United States each year, and the incidence has remained fairly constant. "We do see more leukemic youngsters now," Dr. Truman commented, "but that's because they're living longer."

The chemotherapy plan for a leukemic child is specified by Dr. Truman or by his colleague in the Pediatric Hematology Unit, Dr. Martin T. Fosburg. Miss Foley and nurses from the

inpatient units join with Mrs. Monica Corrigan, RN, of the MGH Children's Clinic staff to provide consistent nursing care.

A few years ago, as better treatment resulted in longer survivals and edged toward the cures of today, Dr. Truman decided that the patients and their families needed a different type of support system. Now with the same nurses providing continuity of care, they can also give excellent emotional support. The entire health professional team explains in depth the disease, the treatment, potential side effects, and the outlook.

Typically, families are introduced to other children who have previously completed the treatment. Seeing former leukemia patients who have been cured reinforces the positive picture for these families.

"There is a great deal of emotional sharing," Miss Foley said. "We were concerned at first that if we introduced one family to another and a child in the second did not do well, we would be imposing a burden on the first group. But then we discovered the families were keeping close tabs on each other just the same."

The result of the various efforts is a warmth and closeness between the health team and the patients and families.

Leukemia is not going to vanish, in Dr. Truman's opinion. And he doubts that a vaccine against the disease will be perfected in his lifetime. But he believes that the future will see improved chemotherapy to lessen the number of leukemic cells found in the body.

"And I think the day will come," he added, "when researchers will discover why some people are susceptible to leukemia while most others are not. That knowledge conceivably could lead to ways of building up the body's resistance to the disease after it strikes, thus allowing for an even greater cure rate." ■



With a surprise cake given to him as a "thank you" gift by Denise Hahn's mother, Dr. Truman joins in celebrating the little girl's continued good health.



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Circadian Rhythm: The Body's Natural Timekeeper

An Unusual Bout With Bacterial Meningitis

For six months Dr. Margaret Horsley felt that something was happening to her. But she could not believe that it was anything serious.

Every morning, the 56-year-old Stoneham, Mass., ophthalmologist awakened to find her pillow wet. The wife of a physician and mother of seven children, four of them doctors, she wondered at first, "Why am I sweating so much?" Then, realizing that only the pillow on her bed had become damp, she thought perhaps saliva was responsible.

Sometime later, Dr. Horsley was bending over a medical chart, entering a notation, when a small amount of fluid fell onto the paper from her nose.

"Now I knew where the dampness was coming from," she said, "but I remembered that while in college I had a roommate who had a number of allergies. She forever complained about a runny nose. So again I saw no reason to be concerned about myself."

Two weeks after Dr. Horsley's nose-dripping episode, a series of rapid events changed her attitude from ambivalence to fright and led to sophisticated medical care by specialists at both the MGH and its neighbor, the Massachusetts Eye and Ear Infirmary (M.E.E.I.).

To avoid duplication of each other's services and expensive equipment, the two Harvard Medical School-affiliated institutions work closely together.

What had dropped onto Dr. Horsley's pillow and onto the medical chart, she learned later, was spinal fluid.

She had been stricken with bacterial

meningitis, an infection of the membranes (meninges) which cover and protect the brain and spinal cord. Spinal fluid flows between two of the three membranes.

To further complicate matters, Dr. Horsley's particular form of the disease is rarely seen in any patient older than 6 years of age. In fact, the majority of patients contracting the disorder are under 2.

(Continued on Page 2)



Physiologic changes in these Canadian geese signal that it is time for them to migrate.

Many species of birds in the Northern Hemisphere fly south for the winter and return in the spring, often traveling thousands of miles each way.

What launches them on their exhaustive journey? A change in the weather? A dwindling food supply?

The fact is some birds in North America head south in August, the region's hottest month of the year when food for them is abundant.

The warning that conditions are about to change and that departure time has arrived comes from a "biological clock."

Just as growth and aging are time-related, many other physiologic functions of the body maintain a rhythm. This chemical ticking, if you will, helps to regulate such basic elements of life as sleep, hunger, the daily rise and fall of bodily temperature and blood pressure, and the production of hormones and other agents.

Studies indicate that as the length of the day and consequent availability of sunlight begin to vary with the approach of a new season, hormonal changes in the body result, and this alerts the birds that moving time is at hand.

Because these clocks are attuned to the daily, 24-hour cycle of light and darkness, the biological movements are referred to as "circadian rhythms" (from the Latin *circa*, meaning approximately, and *dies*, meaning day).

Circadian rhythms affect not only birds but all living beings: bears and other animals that hibernate, salmon that swim from fresh to salt water and later return to their birthplace to spawn and die, deer that shed their antlers

(Continued on Page 4)



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EDITORIAL:

Of Oysters and Bees

Some years ago, scientists in Evanston, Illinois, immersed oysters from the harbor in New Haven, Conn., in pans of sea water kept in a darkened room. For a while the oysters continued their ritual of opening to maximum at the times of the twice daily high tide back in New Haven. In two weeks, however, they had adjusted to their new environment. Now they were opening their shells fully when the moon reached its highest and lowest points above and below Evanston. Why? When at those two points, the moon exerts its greatest gravitational influence on the atmosphere enveloping Evanston. Were Evanston a coastal community, those two periods would represent high and low tide. In other words gravity's effects apparently tell the oysters when to open their big mouths. In their normal environment, opening their shells at high tide enables the oysters to collect food from the water that then submerges them.

In another study, scientists trained honeybees on the East Coast to fly daily at 1 p.m. Eastern Standard Time to a feeding station situated to the northwest. Flown to California, the bees then sought food at 10 a.m. Pacific Coast Time. They had not adjusted to the three-hour time difference between coasts. And, instead of northwest they flew southwest in search of food. A mistake? Not really. On the East Coast the bees had reached their feeding station by keeping the 1 p.m. sun at a certain angle. Retaining the same angle at 10 a.m. on the West Coast sent the bees southwest.

The lead article in this issue cites additional examples of the phenomenon called Circadian Rhythm. Space permits but a few. The study of how animals and man himself depend on this biological clock provides a fascinating glimpse at nature's wile. What makes the stakes higher than mere curiosity, of course, is the probability that we can learn to take advantage of the knowledge of these rhythms to promote better health.

One word of caution: The rhythms described here and in the lead article are not what people often mean when they talk these days about their biorhythms. In that instance people are speculating that the exact time of a person's birth results in "rhythms" that affect his behavior cyclicly for the rest of his life. This theory rests on a rather insecure foundation.

Eye Doctor Suffers Children's Form Of Meningitis

(Continued from Page 1)

The events leading to the diagnosis unfolded after Dr. Horsley performed a cataract operation one morning. She returned to her office to continue working and at 2 p.m. experienced what she described as "the worst headache that I had ever suffered in my life."

She went home thinking that a nap would dispel the pounding in her head, but within two hours she also developed a stiffness in her neck and a temperature reaching 102° F.

Convinced now that whatever illness she had was probably serious, Dr. Horsley consulted her husband, Dr. G. Ernest Horsley, an ear, nose, and throat specialist, and codirector with her of a clinic in Stoneham.

He ordered an ambulance to carry his wife to the MGH Emergency Ward where she could receive a neurological examination.

By the time she reached the hospital, she additionally had lost sensation in part of her face, the pupil in one eye had become dilated and fixed, and she was confused.

A neurosurgical resident obtained a sample of spinal fluid by means of a lumbar tap. Initial laboratory study quickly disclosed the presence of disease-fighting white blood cells in the fluid, a telltale sign of meningitis.

Dr. William H. Sweet, an MGH neurosurgeon and former Chief of the hospital's Neurosurgical Service, was called in consultation.

Dr. Newton E. Hyslop, Jr., a physician in the MGH Infectious Disease Unit, was also asked to see the patient. Although the nature of the organism causing the infection had not yet been identified, the age of the patient and the type of white cells that were found (polymorphonuclear neutrophils) enabled Dr. Hyslop to prescribe antibiotics.

Photography: Page 1, Bill Byrne, Massachusetts Division of Fisheries and Wildlife; p. 3, courtesy of Dr. Newton E. Hyslop, Jr.; p. 4 (upper) courtesy of New England Aquarium; p. 4 (lower), courtesy of The Bradbury Studio; p. 5 (upper), Myron Daniels; p. 5 (lower), courtesy of Airport Journal; p. 6, Dr. R. Ted Steinbock; pp. 7, 8, MGH Photo Lab.



Dr. Margaret Horsley undergoing test with nasal packing to confirm leakage of spinal fluid.

"When the laboratory tests were completed the next day," he said, "Dr. Sweet and I expected to learn that the patient had either pneumococcal or meningococcal meningitis, the bacteria most commonly found causing this disease in adults. Instead, the invader turned out to be an organism called *Hemophilus influenzae*, or H flu."

According to Dr. Hyslop, this disorder is not unusual in children but "is almost never seen" in adults because resistance to the disease develops progressively throughout childhood and adolescence.

"The H flu microorganism often colonizes the sinuses of adults but without causing any illness beyond sinusitis or bronchitis," Dr. Hyslop remarked. "Since Dr. Horsley's blood cultures were negative, it seemed certain that there had to be a defect in one of her brain's protective membranes for the infection to reach her spinal fluid. But where was the defect?"

Working at the patient's bedside in the MGH's Phillips House, Dr. William Montgomery, an ear, nose, and throat surgeon from the M.E.E.I., placed packing in her nostrils. A greenish dye (fluorescein) was then injected into her spinal fluid. When the packing was removed, ultraviolet light showed evidence of the dye on the material, confirming the leak.

Dr. Montgomery also was able to determine that the leak was not in the most common site for cerebrospinal fluid leaks, namely the cribriform plate, a very delicate, perforated bone through which fibers of the olfactory nerve provide us with our sense of smell. Instead, the leak appeared to be

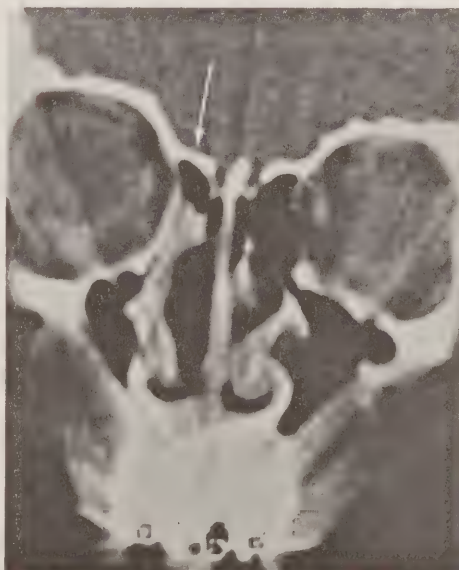
in an area nearby (the posterior ethmoid-sphenoid sinus complex).

What had caused the defect no one can say for certain. Dr. Horsley had been bothered by a sinus condition and, as a remedy, had had the sinus irrigated from time to time.

Less than a month before she became ill, Dr. Horsley also had traveled extensively through South America and had swum in the Amazon River. She admitted that the water was "terribly dirty."

Dr. Hyslop, an Assistant Professor of Medicine at Harvard Medical School, doubted that the swimming alone could have caused any harm, but he said that diving into the water could have inflicted heavy pressure upon the sinuses.

The patient recovered rapidly from



Arrow in this computed tomography skull photo specimen identifies the bony area where in Dr. Horsley a defect led to spinal fluid leakage and bacterial meningitis.

her meningitis under care at the MGH, but the need to pinpoint the exact location of the bony defect in the sinus and repair it remained. Otherwise, the meningitis might recur.

Dr. Horsley was transferred to an operating room at the M.E.E.I. for surgery by Dr. Montgomery to spot the leak and correct it.

After injecting a greenish dye into the patient's spinal fluid for a second time, Dr. Montgomery made an incision between her right eye and her nose. He and Dr. Hyslop then looked inside.

At first, they saw nothing abnormal. Then, they spotted it. From the roof of the ethmoid sinus—a cavity adjacent to the eye and directly under the brain—hung some tissue. When Dr. Montgomery touched it with a probe, greenish liquid emerged.

"The tissue was part of the lining of the dura mater, the outermost of the three membranes covering the brain," Dr. Hyslop explained. "A break in the ethmoid sinus bone had triggered Dr. Horsley's problems."

Until a decade ago, surgeons confronted with such a condition would open the skull, lift up the brain, and effect repairs from above. The rate of relapse following this procedure was fairly high.

Dr. Horsley underwent a different kind of operative technique, one devised primarily by Dr. Montgomery, who is also Professor of Otolaryngology at Harvard Medical School.

He uncovered Dr. Horsley's nasal septum, the cartilage that divides the two nasal passages. Then, from the right side of the septum, he dissected part of a mucus membrane which attaches to the cartilage.

Quite thick and carrying its own blood supply, the membrane was swung over to the sinus defect and placed on the damaged bone to serve as a permanent patch.

Pressure packs in the nose held her membrane in place until the bonding was complete. This alone accounted for about a week of hospitalization at the MGH. When the time came to withdraw the packs, a gelatin preparation which had been spread on them facilitated separation from the membrane.

Over a period of several months, nature provided the nasal septum with new mucus membrane to replace the removed portion.

Because of her speed in seeking
(Concluded on Page 4)



Circadian rhythms are believed to trigger the perilous journey that salmon undertake to return from the sea to quiet inland waters where they spawn (lay eggs) and soon die.

Rhythms Continue Without Time Cues

(Continued from Page 1)

each year, and the most complex creatures, humans.

While among animals the light-dark cycle is the most important factor in synchronizing circadian rhythms to the 24-hour day, man relies upon other cues as well, such as his knowledge of time and his daily life-style.

"It's important to realize that circadian rhythms are not merely driven by the daily changes in the environment," said Dr. Steven M. Reppert, an MGH pediatrician who has done extensive work on biological timekeeping. "Rather, the rhythms are inherent to the organism [our makeup]."

"This is supported by the results of

several studies which show that when humans or animals are placed in an environment stripped of all telltale signs of time, the rhythms continue. Under such conditions the length of the cycle of the rhythm deviates slightly from 24 hours whereas normally the daily environmental time cues function precisely to coordinate the inherent rhythm to the 24-hour day."

Dr. Reppert returned to the MGH recently after spending three years at the National Institute of Child Health and Human Development in Bethesda, Md., where he did research on one of the body's many known circadian rhythms.

Using experimental animals, he sought to develop a better understand-

ing of how the nervous and endocrine systems interact to produce hormone rhythms.

The model for his work was the pineal gland, a small structure located in the brain of mammals. This gland produces the hormone melatonin on a daily basis in response to signals which originate in a biological clock located in another area of the brain.

Melatonin is believed to perform an important role in some mammals which reproduce seasonably. Studies indicate that the hormone relays information on changes in the duration of the daily light-dark cycle.

Dr. Reppert's research included continuous measurement of the substance in spinal fluid samples over a period of time to learn how environmental lighting influenced the hormonal rhythm, or output.

At the MGH, Dr. Reppert is continuing the investigation he undertook at the National Institute. In addition, he intends to study the development of the pineal-melatonin rhythm in laboratory rats and the way in which a pregnant rat communicates information about the daily light-dark cycle to the developing fetus.

Last year, in unrelated research, investigators at the National Institute of Mental Health reported that melatonin production in severely manic-depressive patients, who are often unable to perform the simplest tasks, is greater than in normal individuals.

More importantly, the scientists found evidence among these patients of a shift in the timing of both the hormone's production and the rest-activity



Dr. Margaret Horsley back at work as an eye specialist in Stoneham, Mass.

Meningitis

(Concluded from Page 3)

treatment once she realized that she was seriously ill, Dr. Horsley avoided complications which could have threatened her life.

She was hospitalized for three-and-a-half weeks. After another month of recuperation at home, she returned on May 1 to her practice in the clinic which she and her husband have operated for 12 years.

The medical profession is almost a tradition in their family. Three of Dr. Margaret Horsley's four brothers are physicians, and her husband also has three doctor-brothers.

Among the Horsley's seven children,

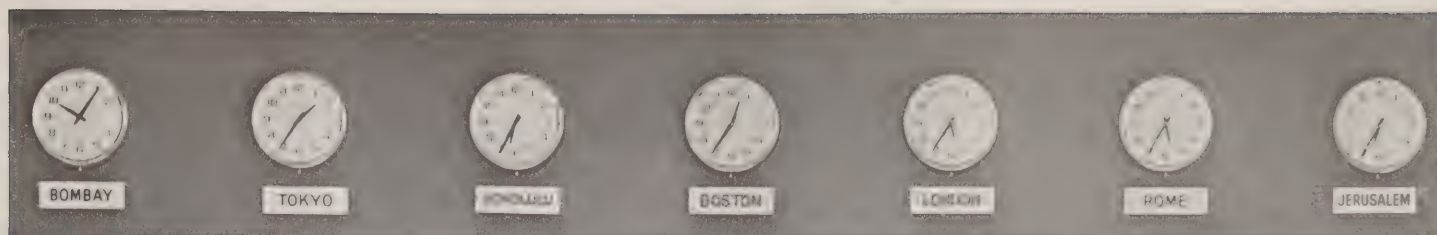
aged 9 to 29, two sons and two daughters are MDs.

One of the sons is studying ophthalmology at Tulane University in New Orleans. The other is at St. Louis University in Missouri, learning radiology. One daughter is in clinical pathology at Parkland Memorial Hospital in Dallas, and the other has begun a family practice internship at a municipal hospital in Fort Worth.

In addition to their four physician-offspring, the parents have a third son who is on the threshold of becoming a doctor and another who has just completed premedical studies.

This leaves Joshua, a precocious 9-year-old, who refuses to be bound by tradition.

He plans to become a dentist. ■



Although air travelers can reach distant cities within hours, the crossing of several time zones may lead to so-called jet lag, upsetting bodily rhythms for days.

cycle. These shifts, they said, could conceivably throw the hormone out of synchronization with some other powerful brain chemical.

Certain antidepressants (tricyclic) have proved useful in efforts to restore normal rhythms and thus improve the condition of the highly depressed person.

Disturbance of circadian rhythms may account for some forms of insomnia.

"For example, individuals with one form of insomnia cannot get to sleep until three or four o'clock in the morning, but then, if uninterrupted, will sleep until noon," Dr. Reppert said. "During leisure periods, this creates no difficulties. However, during work days, these people go to bed at 11 in the evening and stay awake with insomnia until three or four in the morning. Up at seven to go to work, they find themselves miserable and constantly tired."

Someone might suggest, "Go to bed earlier and make up that lost sleep," but as logical as that might sound, it is not the solution.

"Scientists at the Montefiore Medical Center in New York have shown that in these individuals the sleep-wake cycle can be easily manipulated by moving in the other direction," said Dr. Reppert.

"You instruct the person to go to sleep an hour or two later every day until he is finally on, let's say, an 11 p.m.-7 a.m. sleep schedule. He then would be back to a timetable corresponding to his normal life-style."

Dr. Reppert pointed out that this "natural" form of therapy does away with the use of potentially dangerous drugs, but that, although ideal, it is not workable for all forms of insomnia or always practical, considering daily responsibilities.

Long distance air travelers who completely disorient their biological clocks by crossing time zones in just hours instead of days can reset their bodily rhythms by means of the delayed sleep technique.

One such problem: Airline hostesses often find that their menstrual periods

are thrown off schedule by their frequent time changes.

Studies conducted several years ago by scientists at Wright-Patterson Air Force Base in Ohio demonstrated that travelers can adjust to time changes more readily after flights westward.

A group of American university students flew from Ohio to West Germany, underwent two weeks of tests to determine how they adapted to the six-hour time change, and then returned home to face more tests. Corresponding studies were conducted on a group of German students.

The tests showed that the students needed eight days to adjust to the time change after the eastward flight and only five days to recover from the trip west.

The importance of circadian rhythms is becoming increasingly evident among industrial workers. A 30-month government-sponsored survey found that workers on rotating shifts suffered a significantly higher incidence of illness and became more accident-prone because of disruptions of biological rhythms.

Consider, for example, a disruption in the rhythmic output of cortisol, one of the principal hormones made by the adrenal gland. The maximum production occurs soon after awakening in the morning. The level drops to a minimum in the evening. When people reverse their working hours, laboring at night and sleeping during the day, the cor-

tisol rhythm takes from five to 10 days to adapt.

When you consider that cortisol plays a role in carbohydrate, fat, and water metabolism, affects muscle tone and the stimulation of nerve tissue, increases stomach secretion, alters the response of connective tissue to injury, and impedes cartilage production, you realize that a change in the hormone's rhythm can have many consequences.

Physicians must have an understanding of circadian rhythms in order to prescribe chemotherapy (drug treatment) for a patient.

"Since the rate of metabolism and excretion of drugs exhibits daily changes, it follows that the effectiveness of a particular drug will vary considerably, depending on what time of day the agent is given," said Dr. Reppert, who is Instructor in Pediatrics at Harvard Medical School.

"At one time of day the drug would be more rapidly metabolized and excreted. At another hour, a smaller amount of the medication would be just as effective because it is less rapidly metabolized and excreted. In the latter situation, if the drug dosage is not decreased, the occurrence of toxic effects from therapy might be more likely."

Investigators who have been studying circadian rhythms for more than three decades still have much to do, but they have already proved that time is as much a dimension of one's physical being as flesh and bones. ■



Studies have shown that biological clocks altered by air travel return to normal more quickly after flights westward than flights eastward.

Tribal Medicine Men Still Practice Healing Among Many Indians

In some areas of the United States, health care blends old and new practices.

Physicians skilled in the most advanced methods of medical treatment work alongside healers whose art has continued unchanged for centuries.

As tenuous as this relationship may appear, it has helped, rather than retarded, the psychological recovery of the patient.

The patient is the American Indian. While most Indians have high regard for modern-day medicine, those living in tribal communities still seek the help of the medicine man who claims to have powers derived from deeply rooted religious and cultural beliefs.

Among the Indians who have clung most tenaciously to traditional tribal ways are the Zunis, who reside on a 650-square mile reservation near Gallup in western New Mexico. They have occupied the same land for more than 2,000 years.

Dr. R. Ted Steinbock, an MGH Resident in Radiology, spent a year living among the Zunis and tending to their medical needs at a United States Public Health Service hospital situated on the reservation.

"It was not at all uncommon for a medicine man to perform a healing ritual for a patient in the latter's hospital room," he said. "In fact, patients often asked for, and received, permission to leave the hospital temporarily to visit with medicine men."

The Zunis do not see a conflict between their style of healing and modern medicine. They regard physicians essentially as healers of the body, not the mind. Zuni medicine, for the most part, uses psychology to treat disease (psychosomatic medicine).

Witchcraft is a major cause of disease, the Zunis believe. When a tribal member does not feel well, he may claim that a "witch" shot an object into his body. A medicine man is summoned and at the conclusion of an elaborate ceremony marked by chants, drum-beating, and rattle-shaking he will suddenly hold up something, perhaps a stone or a feather, and identify it as the "evil object." Claiming he has just removed it from the patient's body, the medicine man will wrap the object



On day of tribal fair Zuni Indian women march in procession to display homemade jewelry and pottery.

in sacred corn husks and bury it. The patient is then supposed to feel better, and often does.

If the individual still feels depressed or ill, he may visit the hospital. There is no tribal pressure against this.

Despite the size of their territory, the Zunis, numbering seven to eight thousand, are a closely knit tribe. Most reside in or around the town (or pueblo) of Zuni, 40 miles south of Gallup. Historically nonaggressive, they try to maintain internal peace by threatening to attach the label "witch" to anyone, male or female, who adopts an objectionable life-style.

In recent years, however, western ways have made deep inroads into tribal life.

"While you can't buy alcoholic bev-

erages on the reservation," said Dr. Steinbock, "you can easily define its boundaries by the bars doing a brisk business at every corner of the territory."

He said alcoholism not only has led to increased violence among the Zunis but the top four causes of death among the Indians also stem from their consumption of liquor, specifically accidents of various types, cirrhosis of the liver, hepatic encephalopathy (brain disease associated with liver problems), and upper gastrointestinal bleeding.

For centuries the Zunis enjoyed a reputation as fantastic runners, capable of covering up to 150 miles without stopping, but, according to Dr. Steinbock, "their running prowess is not as great as it used to be.

"Proportionately speaking, you'll find just as many overweight people among the Zunis today as you will among white North Americans."

Unlike their neighbors, the Navajos, who are predominantly nomadic, deriving their income from sheep-raising and other outdoor activities, the Zunis live a fairly sedentary existence. Their sale of exquisite jewelry fashioned at home from silver, turquoise, and jet provides 90 percent of their annual earnings.

Dr. Steinbock, who is also an anthropologist, said inactivity combined with a diet high in starch is what makes the Zunis so susceptible to obesity. In some cases, the condition has been worsened by hypertension, adult-onset diabetes, and heart disease.

A decade ago, heart disease was virtually nonexistent on the reservation. Three years ago, when Dr. Steinbock worked for a time at the Zuni hospital as a Harvard Medical School student,



Zuni Indian woman in ceremonial dress

Some Patients Feign Serious Illness

"... I will prescribe regimen for the good of my patients according to my ability and my judgment and never do harm to anyone. . ."

To these solemn words in the Hippocratic oath, the ethical guide of the medical profession, could be added the plea, "But save me from being duped!"

When someone appears at the door of an emergency room complaining of severe pain indicative of a serious, even potentially life-threatening, condition, the response is automatic. Track down the problem and treat it. Few physicians question the veracity of the patient as a first response.

Unfortunately, some people take advantage of the physician's trusting nature. Feigning acute illness and presenting a dramatic medical history predicated on false claims, they deceive their way into hospitals.

Why would anyone fake to get into a hospital? He could be a malingerer. Deceit for gainful purposes is not difficult to comprehend.

On the other hand, the patient might be someone suffering from a psychiatric disorder called Munchausen's syndrome. Deprived of parental love in their childhood, these people yearn for affection. At the same time, masochism enters the picture. Some form of pain must accompany the caring.

Medicine provides the ideal arena. In addition to regarding doctors as authority figures, the Munchausen patient looks upon them as all-caring and all-giving. Diagnostic procedures that may call for injections, the drawing of blood, or some kind of intravenous support, seem to fulfill the need for pain.

Although medical textbooks describe Munchausen's syndrome as rare, most doctors have either seen or heard about such patients. The mere possibility of an encounter with a Munchausen patient causes concern because typically during the course of hospitalization the patient turns against the care giver.

The seemingly genuine appeal for help against some physical distress suddenly shifts into reverse as the patient brands the doctor, nurses, and other hospital personnel as worthless. The attack culminates with the patient storming from the hospital. Often he turns up at other hospitals to reenact the same bizarre drama.

The syndrome is named after Baron Karl Friedrich Hieronymus von Münchhausen who lived in Germany in the 1700s. He gained fame around Hanover by recounting extraordinary tales about his life as a soldier, hunter, and sportsman. These stories were later embellished and published in London by a fellow German, Rudolf Raspe.

To this day, Munchausen's name is used to describe a teller of tall tales.

The Munchausen patient does not rely solely on a carefully concocted spiel to get his way. "It must be recognized that these patients are frequently quite ill, although their illness is clouded by deception and distortion," said Dr. Theodore A. Stern, an MGH psychiatrist. "Often a real organic lesion from the past has left some genuine physical signs on which the patient elaborates to make a convincing story."

(Earlier this year, in large part due to a comprehensive paper he prepared on Munchausen's syndrome, Dr. Stern was presented the Edwin Dunlop, MD,



Masochism, a need for pain, is an identifying characteristic of the Munchausen patient.

Award of the American Professional Practice Association. The award, honoring a founder of the association, is given annually to a psychiatric resident in his final year of training at the MGH "to recognize outstanding academic-research achievement during the residency training program and potential for future academic contributions to the progress of psychiatric knowledge.")

Speaking at an MGH Psychiatric Grand Rounds, Dr. Stern said that Munchausen patients complain most often of abdominal, neurological, or hemorrhagic problems. A multiplicity

(Concluded on Page 8)

it still was unusual to treat someone for a heart attack. But this past year, Dr. Steinbock said, "we had quite a few heart patients."

Zuni winters pose a distinct threat to health. Living at 7,000 feet above sea level, the reservation Indians and their estimated 5,000 Navajo neighbors must gird against numbing cold and frequent heavy snowstorms. Last winter's total snowfall exceeded 100 inches.

Although many Zunis live in concrete block homes with adequate plumbing and heating facilities, other members of the tribe still reside in old-style adobe structures lacking any

amenities. Many Navajo families also live primitively in overcrowded, single-room hogans (earth-covered dwellings).

Striving to meet the health needs of both tribes, seven young physicians, 10 registered nurses, and 15 licensed practical nurses staff the single-story, 40-bed Zuni hospital, built only three years ago.

Some of the doctors trained in primary care, others in pediatrics, and still others, like Dr. Steinbock, in internal medicine. He undertook a year of medical residency at the MGH following graduation from Harvard Medical School.

Although patients needing major surgery are referred to a government-run hospital in Gallup, the staff at Zuni treats a full range of medical problems. The care is provided free.

Not very long ago, the severity of the winters coupled with crude living conditions led to illnesses which caused a high infant mortality rate. Thanks, in part, to medical care which begins before the baby is born and continues well afterward on a regular basis, the picture has improved considerably.

Dr. Steinbock estimated, in fact, that half the residents of Zuni are under 15 years of age. ■

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Munchausen Patients Expose Own Fakery

(Concluded from Page 7)

of scars from previous surgery and a knowledge of medical jargon (the patient frequently works in the health field) contribute to the intended deceit.

One patient, described in the medical literature 16 times, underwent at least nine or 10 operations. Dr. Stern said the individual had so many incisions on his stomach wall that there was "practically no more wall muscle that could be sewed together."

Patients do not necessarily stick to a single symptom. They may switch, for example, to the urinary tract and inject themselves with foreign materials to cause infection in the bladder. Any liquid found by the bedside will do.

Sometimes the patient will fake a fever by heating a thermometer with a cigarette lighter or on a nearby radiator.

"Through such actions, of course, the patient sabotages his own plot because he makes it easy for his deception to be discovered," Dr. Stern pointed out.

Why this sudden change of attitude which only induces frustration and loss of interest in the patient?

"The patient begins to suffocate from his growing intimacy with and dependency upon the authority figures in the hospital," explained Dr. Stern, who recently was named Clinical Instructor in Psychiatry at Harvard Medical School.

"Feeling that he would not be able to survive if he were too dependent upon another person, the patient moves to sever his bond. He could simply say, 'Goodbye, I don't need you anymore,' but, instead, he goes into a rage, accusing the staff of misdiagnoses, mistreatment, and making his condition worse.

"Finally, the patient either signs out claiming that the physicians are incompetent, or the doctor advocates a prompt discharge. At this point, it is

difficult for the frustrated physician to recognize with detachment and kindness the psychological suffering of the patient. For this reason, psychiatric evaluation is seldom requested."

A computer search to determine how many people were discharged from the MGH during the last 10 years following a diagnosis of Munchausen's syndrome yielded only 10 names.

Of these, the attending physicians requested psychiatric consultations on five patients, but only two ended up being seen. The others refused to see a psychiatrist, claiming, "There's nothing wrong with my mind."

Reluctance to discuss the possibility that they have a mental disorder is common among Munchausen patients, who are usually in their 20s or 30s. Some, however, are in their 60s when their problem is detected. The illness seems to affect more women than men.

The diagnostic appropriateness of using the label Munchausen's syndrome has long been debated. To some medical people the title implies that the patients are simply liars, tricksters, or swindlers.

"Hospital hoboes," "hospital ad-

dicts," and "peregrinating problem patients" are among a host of names suggested as alternative titles, but, in the end, most, if not all, still reflect the frustration aroused in the physicians called to give treatment.

"The preferred treatment for Munchausen's syndrome is long-term inpatient psychiatric care," said Dr. Stern, but he added: "Cures are not easy to come by. The patient doesn't want just caring, but caring with pain, and masochism is very difficult to treat."

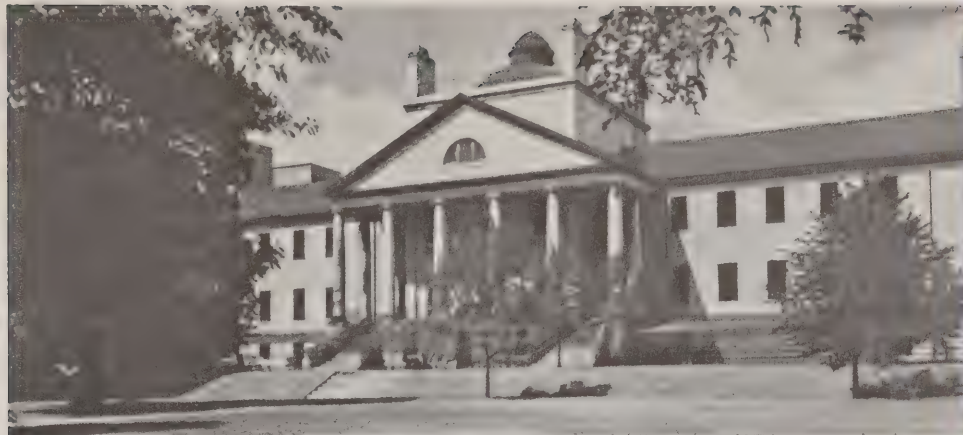
He said the doctor must try to convince the patient of two things: that his suffering is self-induced and that to stop being masochistic does not mean that he will become the helpless slave of his environment.

Another view is that the analyst must take the patient's side against those whom he feels to be his enemy, and the analyst should show that the patient's hostility is not his own but is derived from his parents' real antagonism toward him in childhood.

"By creating an alliance with him over his feelings of sadness, loneliness, and emptiness," Dr. Stern declared, "our attempt to give him what he really needs, the caring alone, might be effective." ■

This commemorative stamp depicting Baron Munchausen riding a transected horse was issued by the West German government nine years ago.





MGH News

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November, 1979

Mounting Psychiatric Needs of Young Bring Action

Brain Bank Spurs Study of Baffling Illness

On a midwinter day in 1872, Dr. George Huntington lectured to physicians at Middleport, Ohio, on a nervous disorder marked by uncontrollable and irregular muscular movements.

The most common form of the disease, called chorea (from the Latin, meaning *dance*), is by no means a dangerous or serious affliction, Dr. Huntington said, but near the end of his talk he remarked:

"And now I wish to draw your attention more particularly to a type of the disease which exists, so far as I know, almost exclusively on the east end of Long Island. It is peculiar in itself and seems to obey certain fixed laws."

Referring to what he termed the *hereditary* chorea, Dr. Huntington spoke of symptoms progressing gradually "until the hapless sufferer is but a quivering wreck of his former self." Once the condition sets in, he said, "no treatment seems to be of any avail."

The peculiar disorder, which became known as Huntington's disease, to this day has thwarted the efforts of scientists to alter its course. First thought to be confined to a particular geographical area, the disease, in which brain cells slowly die, has turned out to be worldwide in scope.

Doctors estimate that in the United States and Canada alone at least 100,000 people either suffer from the affliction or have reason to fear that someday they will.

The future does not seem as bleak as the past, however. In recent years, investigators have accumulated data encouraging certain new avenues of study.

To aid in this expanded research, the MGH has established a Brain Tissue Bank at one of its psychiatric divisions, McLean Hospital, in Belmont, Mass.

The availability after death of human brain tissue for study is vital if man is to understand how disorders of the brain may trigger mental illness. The majority of neurochemical tests can be carried out on a very small amount of tissue.

Supported by grants from the National Institutes of Health, Huntington's Chorea Foundation, Hereditary Disease Foundation, and Scottish Rite Foundation, the bank is directed by Dr. Edward D. Bird, who joined the MGH

(Continued on Page 2)



Sections of brain tissue are preserved in a freezer at minus 70°C by Mrs. Deborah Freeman, research technician, pending future use.

... After a loud and bitter argument with her parents, a 14-year-old girl locked herself in a bathroom and swallowed the contents of an aspirin bottle.

... When the new baby arrived, the family's 5-year-old became withdrawn. Then suddenly, without provocation, he attacked the infant.

... Pushed and pulled between her parents as they were going through a stormy divorce action, an 8-year-old burst into uncontrollable sobs one day in class.

... Suffering from an unrecognized learning handicap, a 10-year-old boy developed feelings of worthlessness because he could not fulfill the expectations of his teachers and friends.

A federal panel has estimated that 15 percent of America's 65 million children under 18 suffer from mental or emotional disorders.

Each year, a million youngsters flee their homes. With the nation's divorce rate climbing steadily since 1963, the number of children in families affected by divorce has soared, reaching 1,123,000 in 1975. Of 564 suicides reported in Massachusetts in 1977, 34 percent involved adolescents.

The potential stress confronting today's young people is probably unprecedented.

In an effort to provide relief from pressures that may build from any one of a multitude of causes, the MGH Children's Service and Psychiatry Service have stepped up the availability of psychiatric care to youngsters on both an inpatient and outpatient basis.

In effect since July 1, the program has resulted in a 25 percent increase in patient visits to the Child Psychiatry Clinic and an even greater rise in the

(Continued on Page 6)



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Feared Brain Illness Needs Verification By an Autopsy

(Continued from Page 1)

Neurological Service in August, 1978. Previously, he had devoted nearly seven years to Huntington's disease research at the University of Cambridge in England.

"The brain tissue we collect is available to any researcher anywhere in the world who thinks he may be on the track of information that can clarify this disorder," Dr. Bird said.

He stressed at the same time that every patient with the diagnosis of Huntington's disease should have an autopsy after death. The verified diagnosis can then be documented in hospital records to serve as a continual reference for physicians caring for future generations of that patient's family.

Dr. Bird, who also directed a brain bank at the University of Cambridge, said that about seven percent of post-mortems on Huntington's disease patients have shown the diagnosis to be incorrect.

In many cases, the affliction turned out to be either premature senility (Alzheimer's disease) or degeneration of the cerebellum, a brain structure which coordinates complex, voluntary muscular activities.

Such findings provide great relief to the patients' children who would be facing a 50-50 risk of developing Huntington's disease if, indeed, the original diagnosis were accurate.

The malady directly attacks two areas of the brain: the basal ganglia, masses of cells which govern motion, and the cerebral cortex, an outer layer of gray matter which is responsible for man's higher mental functions.

In the vast majority of instances, the symptoms of the disease appear when the patient is between 37 and 47 years of age. The first signs may be very subtle twitching movements around the face and eyes, or in the fingers or toes. Very slowly, through succeeding years, these jerking motions become more extensive.

The patient finds he can no longer stand erect and must sit most of the

EDITORIAL:

Providing a Measure of Reassurance About an Unfortunate Problem

No word strikes more terror than "cancer." The MGH discovery in 1971 that DES (page 4) is associated with a rare form of cancer in women had a tremendous potential to frighten. Compounding the concern was the fact the cancer developed not in women who took DES to avoid miscarriage, but many years later in their female offspring.

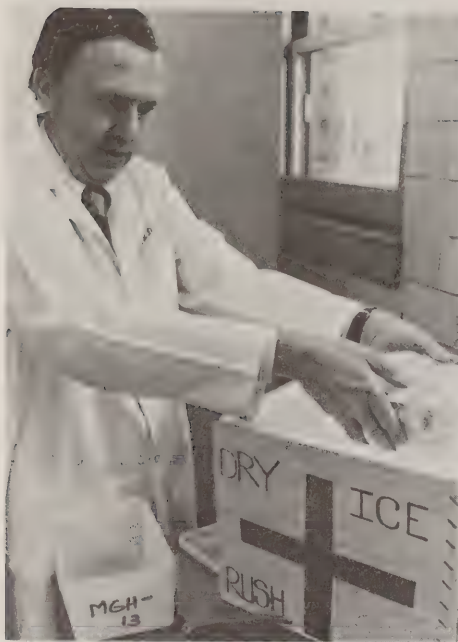
Telling the story of DES in a way that avoided sensationalism was a difficult task for the hospital and the news media. For its part the hospital, responding to news media questions, strove to put the situation in perspective: the cancer was almost always curable if it were small and treated early. Preliminary evidence indicated that an extremely tiny percentage of exposed young women would ever develop this cancer. Many persons would have noncancerous changes in the vagina, but rarely would they cause problems.

In spite of the evidence, some sensationalism did occur causing unnecessary apprehension.

Since 1971, additional findings have surfaced, but they tend to pale beside the original discovery. Essentially, the conservative perspective of 1971 has to date remained the same. From around the world, a special registry has recorded some 400 cases of vaginal and cervical cancer in young women, two of every three patients having confirmed exposure to DES. But as many as two million daughters have been linked prenatally to the drug.

For each of the women who have gotten cancer, the knowledge that they represent such a tiny minority proves of little comfort. To those who have lived in fear that cancer may one day result, their concern is very real. Nonetheless, there should be a great deal of comfort derived from the fact that the original perspective remains so accurate even today. The message is still largely one of reassurance rather than of concern, of hope rather than hysteria, and of careful surveillance.

Photography by Myron Daniels;
Page 3 (upper), Lynn McLaren.



Dr. Edward D. Bird receiving a shipment of brain tissue at the MGH's McLean Hospital.

time. Eventually he is confined to bed and becomes susceptible to bronchopneumonia which speeds death.

As the patient becomes increasingly debilitated, mental faculties simultaneously wane. At first forgetful and restless, the individual later exhibits a deepening inability to reason and remember. He can no longer read newspapers or carry out the most perfunctory chores.

Death for the typical Huntington's disease patient usually occurs about 15 years after the symptoms first appear.

Dr. Bird, who is Associate Professor of Neuropathology at Harvard Medical School, said studies of brain tissue obtained at postmortem with family permission have revealed that, contrary to original beliefs, the disease can appear at any age.

The diagnosis was made in a boy from Liverpool, England, who died at the age of 6. His parents, aware of a family history of the disorder, requested the autopsy.

Dr. Bird told of another Huntington's disease patient who lived to 85. The victim's father, who passed on the illness, had lived to the same age.

Early onset of the affliction usually results in a more rapid and severe progression of the symptoms. Conversely, late onset often allows the patient to live longer and without serious, accompanying dementia.

"If it takes, say, 65 years for symptoms such as twitching to even appear," Dr. Bird declared, "then it's reasonable to expect that the cortical loss affecting mental powers will be minimal."

Most scientists agree that the disease never skips a generation; that is, a person can only inherit the gene from a parent. When an individual is destined to develop the disorder late in life, however, the question of skipping frequently comes up for renewed discussion.

The debate usually arises when a parent whose family has a history of the illness dies from some other cause at an age considered beyond the "normal" time frame for Huntington's, and a son or daughter then becomes stricken.

"Who can really say what the so-called normal time frame was for the parent?" Dr. Bird asked. "The disease might very well have manifested itself later in his or her life if something else had not interceded."

Scientists have striven in vain for years to develop a predictive test for Huntington's disease. "This may not come," Dr. Bird declared, "until we have identified the primary defect causing the condition."

The same is true, he added, of treatment. Although no drug has been found that will halt the progression of the disease, some can relieve the symptoms, making life more bearable. These include major tranquilizers such as the phenothiazines and haloperidol. Reserpine, an old standby for high blood pressure, also has been helpful.

Some of the drugs prescribed for Huntington's disease also are used in treating schizophrenia. Because they bear a number of outward similarities, the two illnesses sometimes lead to mistaken diagnoses.

"When I was in England, I reviewed about 400 records of patients with Huntington's disease," Dr. Bird said, "and I was amazed at the number of cases originally diagnosed as schizophrenia."

"Some patients thought to be schizophrenic spent years in mental institutions before they developed movements indicative of Huntington's. Then somebody would delve into the family history of the patients and discover the true nature of what they had."

Folksinger Woody Guthrie, who died in 1967 after suffering 13 years from Huntington's disease, originally was diagnosed as an alcoholic. Guthrie's widow, Marjorie, is cofounder and president emerita of the National Committee to Combat Huntington's Disease. Several MGH personnel, including Dr. Joseph B. Martin, Chief of Neurology, and Dr. Bird, are medical

advisers to the committee's Massachusetts chapter.

Dr. Bird was among the first scientists to report that brain cells killed by Huntington's disease included cells that make GABA (gamma-aminobutyric acid) and acetylcholine, two chemicals which transmit brain messages.

The decrease in those chemicals, however, cannot be interpreted as a specific defect since the brain tissue of other people known to have died from Parkinson's disease, for example, might display similar deficiencies.

"Our job is to identify whatever it is in Huntington's disease that is poisoning the cells making GABA and acetylcholine," Dr. Bird said.

Of particular interest to Drs. Martin and Bird are recent studies indicating that chemical "releasing factors," or peptides, involved in neuroendocrine control also play an important part in brain function itself. (*MGH News*, Sept. 1978.)

The studies suggest that some enzymes which convert peptides from one form to another are disordered in those areas of the brain known to be affected in Huntington's disease.

"We've learned a lot more about this disease in the past decade than we did in all the previous years since the malady was first described," Dr. Bird remarked.

"With this ever increasing momentum forward, I think that within the next 5 to 10 years we ought to be very close to understanding what the biochemical defect is that is causing the disease. Once that is known, then I think effective treatment will follow fairly promptly." ■



Using a microtome, Technician Deborah Freeman prepares to section brain tissue for microscopic study.

Investigators Press Efforts to Clear Up The Status of DES

The drug diethylstilbestrol (DES) was outlawed for use in preventing miscarriages after MGH scientists linked the medication to a rare form of cancer in female offspring. Eight years later, investigators are still compiling and examining data. The following article explains how DES became suspect and what the probe has disclosed so far. [EDITOR'S NOTE.]

When Dr. Howard Ulfelder arrived at his MGH office on May 11, 1966, he anticipated a day that would be unusual. But the then Chief of the hospital's Gynecological Service could hardly have foreseen the events that followed.

Dr. Ulfelder's appointment schedule called for a visit by a teen-aged girl who three months earlier had undergone surgery for a rare form of vaginal cancer. In all of medical literature only four cases of that particular type (clear cell adenocarcinoma) had been recorded in women between 15 and 25 years of age.

Dr. Donald Hayes of Springfield, Mass., who had operated on the teenager, sought Dr. Ulfelder's opinion on further management of the patient. The MGH specialist could find no lingering evidence of a tumor and decided that no further treatment was necessary.

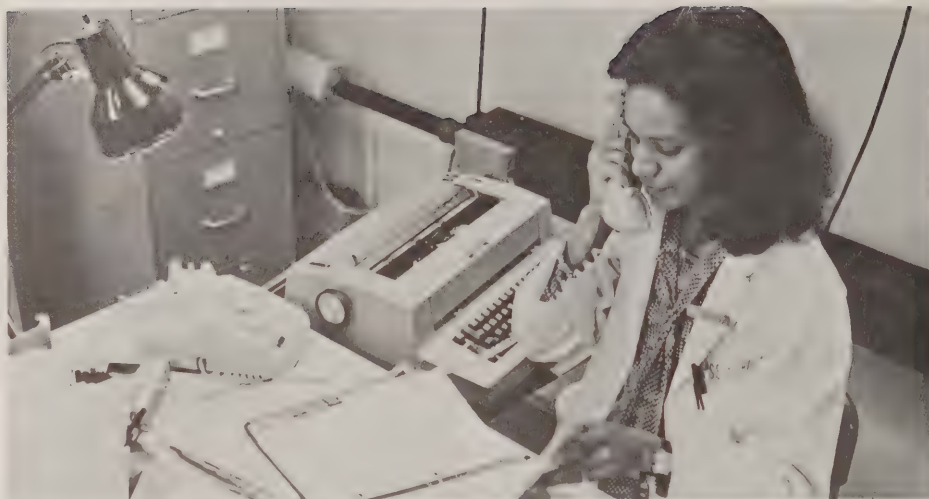
Little did he realize that, despite the extreme rarity of the disease, the next three years would find him treating four more young women with the same condition, and two other MGH gynecologists, Drs. Thomas H. Green, Jr., and Francis M. Ingersoll, would increase the number of these patients to seven.

At Dr. Ulfelder's request, details of the seven cases referred to the Massachusetts General were compiled by two MGH colleagues, Drs. Arthur L. Herbst, now Chairman of the Department of Obstetrics and Gynecology at the Chicago Lying-In Hospital, and Robert E. Scully, a pathologist. Drs. Herbst and Scully published the material in the journal *Cancer* in April, 1970.

Behind the scenes, meantime, Dr. Ulfelder directed efforts to learn the cause of what he termed "this multiplicity of rarities."

He already had one possible lead.

During a follow-up visit by one of the cancer patients, the patient's mother asked Dr. Ulfelder whether she had



Mrs. Wenda Ashford (top photo) arranges appointment for woman caller who had been exposed to DES. Miss Lee Lanza (center photo) interviews DESAD Project applicant. In bottom photo, Dr. Ann Barnes is at colposcope, which permits magnified examination of cervix and vagina.

ever mentioned to him that during pregnancy she had taken a prescribed drug called diethylstilbestrol (DES).

The drug, a synthetic female hormone (estrogen), had been prescribed for pregnant women ever since the 1940s to help them avoid miscarriage.

Because of the query both Drs. Herbst and Ulfelder checked with the mothers of other victims of the rare clear cell adenocarcinoma and found sufficient involvement of DES in the pregnancies to warrant a full-scale investigation, with a control, or comparison, group included. By now, the number of patients contracting the cancer had risen to eight, the latest case reported by Boston's Peter Bent Brigham Hospital.

The two doctors designed an epidemiological study with Dr. David C. Poskanzer, an MGH neurologist who had considerable experience in such projects.

"The eight known cancer patients represented our study group, and we chose 32 other young women to serve as controls," said Dr. Ulfelder, who is now Deputy to the MGH General Director for Cancer Affairs.

"For each cancer patient, we randomly selected for the control group four women who had been born the same week as the patient and in the same hospital."

The results of the study, financed by the Massachusetts Division of the American Cancer Society, caused a national stir when published in the *New England Journal of Medicine* in 1971. Dr. Herbst was principal author.

No evidence of any DES exposure



was found among the 32 control subjects, but of the eight patients stricken with the unusual form of cancer, seven had been exposed prenatally to the drug.

These findings led to follow-up work, including establishment by Drs. Herbst and Scully of a registry to record all cases of clear cell adenocarcinoma whether they involved DES or not. Later in 1971 the United States Food and Drug Administration ordered a halt to use of the drug by pregnant women to avoid miscarriage.

Ironically, two controlled, clinical

trials of DES as far back as the early 1950s had questioned the effectiveness of the medication for that purpose, according to Dr. Ulfelder, who is also president of the Cancer Society's Massachusetts Division. Still, the drug had continued in use.

It is estimated that between 1940 and 1971 as many as six million mothers and unborn children were exposed to DES.

In the past eight years, many additional studies of the drug have been conducted. The findings sometimes have conflicted, but the largest, most thorough investigation, funded by the National Cancer Institute from 1974 to 1981, has brought reassurance to DES-exposed mothers and children.

The investigation is called the DESAD (DES and Adenosis) Project. Adenosis refers to continued presence in the vagina of a noncancerous glandular tissue which normally disappears during formation of the fetus.

Conducted by a task force comprised of investigators at the MGH, the Mayo Clinic in Rochester, Minn.; the Baylor College of Medicine in Houston, and the University of Southern California in Los Angeles, the project to date has studied more than 4,000 young women exposed or suspected of having been exposed before birth to DES.

The project's latest report diminished fears that DES poses a serious threat to the vast majority of women whose mothers took the medication. The findings were presented at an annual meeting of the International Society of Pathology in San Francisco by Dr. Stanley J. Robboy, an MGH pathologist who serves as coprincipal investigator of the DESAD Project, along with Dr. Ann B. Barnes, an MGH gynecologist.

The project team concentrated on 1,275 participants whose DES exposure was identified by review of prenatal records. These young women, the team contended, more logically represented overall DES-exposed offspring than other so-called "walk-in" patients or physician referrals among the previous total of 3,339 project participants.

Of the 1,275, Dr. Robboy reported:

- No cancers were discovered.
- The occurrence of abnormally developed tissue (dysplasia) was very rare, no greater than in control subjects.
- Changes in the lining of the vagina, including adenosis, were found in only 34 percent of the women, substantiating a finding by an MGH team led by Dr. Herbst and published in 1975 in the

New England Journal of Medicine. The percentage is much less than had been suspected by some other researchers.

• And beyond the age of 26, the frequency of changes in the vaginal lining decreased markedly in those exposed, suggesting that some effects of DES exposure vanish as women grow older.

In the entire study involving the 3,339 participants, only four had clear cell adenocarcinoma. Since all four came from the group referred by physicians, the risk for these patients was expected to be greater.

(Patients are much more likely to seek physician help if they have symptoms such as unusual vaginal bleeding, a possible sign of adenocarcinoma of the vagina or cervix.)

The risk of developing clear cell cancer is estimated to be no more than 1.4 per 1,000 and possibly as few as 1.4 per 10,000 exposed daughters up to age 24.

Thus, even for these exposed daughters, the hazard ranks many times lower than that of an unexposed woman getting breast cancer.

Some 400 cases of vaginal and cervical cancer have been reported from various parts of the world to the special registry maintained by Dr. Herbst, first at the MGH and now in Chicago, although the pathology portion of the work remains at the MGH under Dr. Scully. Dr. Priscilla D. Taft of the MGH Cytology Laboratory reviews all cellular specimens for the registry and for the DESAD Project at the MGH.

About two-thirds of the tumors recorded by the registry were associated with DES.

The finding of only a 34 percent frequency of vaginal changes among the DESAD record-review group of 1,275 contrasted with changes in 65 percent of participants referred by doctors and in 59 percent of women who personally requested enrollment in the study because of known exposure.

The groups with the higher percentages were described by Dr. Robboy as a medically biased population.

He contended that many other DES studies have been unduly biased by the methods of recruiting patients for the research and by probable errors in interpreting adenosis.

Speaking of adenosis, Dr. Robboy said that a cancer must arise from something, and it is logical that a glandular cancer (adenocarcinoma) arises from a glandular tissue.

"We haven't reached the point of prescribing any active treatment for adenosis," he said. "Perhaps the best approach now is simply to watch rather than subject the patient to a treatment that may well be unnecessary."

Earlier this year, Dr. Barnes told the annual meeting of the American Fertility Society in San Francisco that the ability of DES-exposed women to become pregnant is no different from that of women generally.

She reported, however, that in studies of 300 record-review patients and 300 control patients, the DES-exposed women gave birth to a few less full-term, live babies.

"The difference is not a big one, but it exists," she said. "What it means is that most women exposed to DES will

(Concluded on Page 6)



Mrs. Mardi Marean, RN, left, and Miss Sally Nash, DESAD Project administrator, review photographic slides taken during colposcopy.

Child Psychiatrists Cut Wait For Care

(Continued from Page 1)

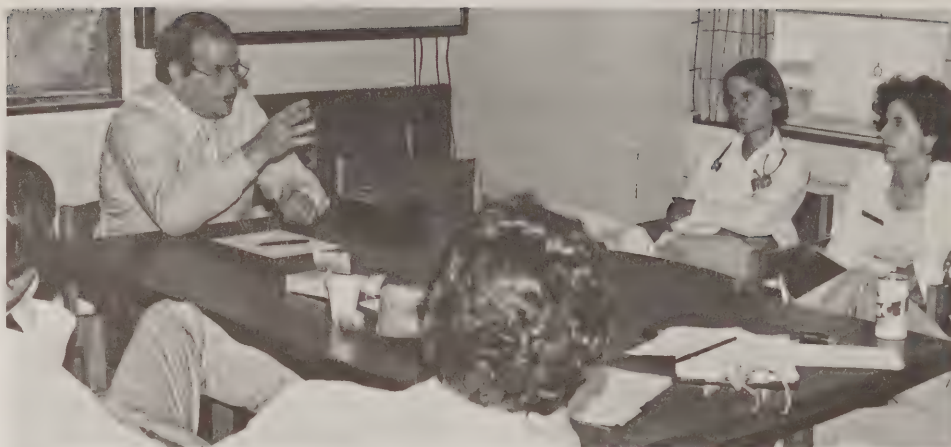
number of inpatient consultations.

Dr. Thomas P. Hackett, Chief of Psychiatry at the MGH, had long recognized the need in pediatrics for a formal psychiatric program and played a key role in its establishment.

Since assuming his post two years ago, Dr. Donald N. Medearis, Jr., Chief of the MGH Children's Service, also had consistently sought closer working relationships with other MGH departments whose specialties could help improve the health of children.

"The creation of a Child Psychiatry Service under Dr. Michael S. Jellinek has provided a new and vitally needed dimension to our care of the young," Dr. Medearis said.

With the wholehearted support of



Dr. Michael S. Jellinek, Chief of the Child Psychiatry Service, meets regularly with pediatric house officers for informal discussions on the psychiatric problems of young patients.

Dr. Charles A. Sanders, MGH General Director, and Dr. Hackett, Dr. Medearis said his service can now deal much more effectively with the complex psychological and psychiatric problems that are becoming more evident among many of today's children.

In many child psychiatry clinics the processing of a patient referral often takes four to six weeks before treatment begins. At the MGH, where the wait was also long, the processing has been reduced to a matter of days.

Meantime, on the inpatient floors of

DES Researchers Expand Studies

(Concluded from Page 5)

have the children they want, but a few others will have problems. We're now trying to find a way to identify those who might experience difficulties."

During the summer, Dr. Barnes published results of an MGH study on the menstrual cycle of DES daughters. The research showed that the age at which they began menstruating was the same as that of other girls. Regularity of the cycles also coincided.

DES investigators at the University of Chicago, Stanford, Mayo Clinic, and elsewhere are studying genital abnormalities in some sons of women who took the synthetic hormone. When asked whether DES-exposed sons face a greater risk of testicular cancer, however, Dr. Robboy, an Associate Professor of Pathology at Harvard Medical School, commented:

"The research thus far has dealt with very small numbers of patients. There is no good evidence at this time of an association of DES exposure and any cancer in sons."

Mothers of DES-exposed children are coming under scrutiny in connection with breast cancer. One study has shown a slightly higher frequency of such tumors in exposed mothers (4.6 percent) than in nonexposed mothers (3.1 percent).

The authors themselves said that, because of the small number of women

studied, the results were not statistically significant. Dr. Robboy pointed out that it has been estimated breast cancer will ultimately develop in seven percent of all women in the general population.

Although prohibited for purposes of avoiding miscarriage, ironically DES is still allowed by the Food and Drug Administration as useful in the treatment of selected cases of advanced cancer of the breast or prostate.

Other approved uses: Estrogen replacement therapy for young women whose ovaries have been removed or who have retarded growth and sexual development, relief of menopausal symptoms, and suppression of milk production (lactation) in new mothers who do not breast-feed their infants. The government may reconsider permission for the latter. Formal permission has been sought for the use of DES as a "morning after" contraceptive pill.

Enrolled in the DESAD Project at the MGH are nearly 1,100 young women exposed or suspected of having been exposed to DES before birth.

"Most were anxious and very frightened when they first came to us, but they were not quite sure what they should be worried about," said Dr. Barnes, who is an Assistant Clinical Professor of Obstetrics and Gynecology at Harvard Medical School.

"However, our DESAD center is now in its fifth year, and we are able to tell our members that at the MGH

during that period we have not encountered a single individual with the kind of cancer associated with DES exposure."

Acquaintanceships with other women enrolled in the DESAD Project, coupled with yearly checkups, provide further comfort. ■

If Exposed to DES

The first examination of known or suspected DES-exposed daughters should take place when menstruation begins or by the age of 14 if menstruation has not occurred.

Examination of younger girls is not advised unless vaginal bleeding, spotting, or abnormal discharge occurs.

The gynecologist should periodically carry out a breast examination, Pap smears, preferably of both the cervix and vagina; examination and palpation of the vagina, and iodine staining to indicate the presence or absence and the boundaries of any changes in the vaginal or outer cervical lining.

Diagnosis may or may not include colposcopy, a magnified examination of the cervix and vagina, and a biopsy for microscopic study.

Records of a physician who attended a mother during pregnancy can easily confirm whether her child was exposed prenatally to DES. When such records are unavailable, but the mother believes she may have taken DES, examination of the daughter is still recommended.

the Children's Service, each of four psychiatrists devotes 10 hours a week to discussions with patients, parents, or hospital staff personnel. Previously, such consultations were available only on an "on call" basis.

Three of the four members of the child psychiatry team, Drs. Jellinek, David Herzog, and Lawrence F. Selter, are also fully trained pediatricians. The fourth, Dr. Jennifer Rathbun, in addition is a candidate at Stanford University for a doctorate in Developmental Psychology.

"If there is one word to describe the vast majority of conditions we see, it would have to be 'loss,'" said Dr. Jellinek.

"The loss may be caused by any number of things, such as a divorce, a parental death, a physical injury, or a chronic disease, and may manifest itself in angry outbursts, ongoing conflicts with parents or friends, depression, the taking of risks, or, especially among adolescents, suicide gestures.

"We feel that if we can intervene at an early point in a crisis or in a maladaptive pattern of behavior, we can relieve the child's distress and allow normal development to continue."

From left, Staff Nurses Barbara Dalton, Deirdre O'Connor, and Rebecca Lyon seek advice from Dr. Lawrence F. Selter of the MGH Child Psychiatry team.



This month the Child Psychiatry Service is inaugurating a clinic program to assist parents and children of families distressed by divorce.

The program calls for a parent and child to visit the clinic together but then separate; the mother or father joining an adult group, the youngster meeting with others of his own age. At the respective hour-long sessions, each supervised by a psychiatrist, mutual problems will be discussed and proposed solutions explored. Six to eight visits may be suggested.

"Our plan is simply to offer help

before a child becomes disturbed or a problem becomes deep-rooted," said Dr. Lois Slovik, Coordinator of Family Services in the Child Psychiatry Clinic. "We don't propose to engage in any long-term psychotherapeutic relationships unless at the end of the sessions a child clearly needs such help."

Children have their ups and downs. A youngster cannot be labeled as disturbed just because on a particular day he preferred not to play with his friends.

"We have to look at certain areas to determine whether the child is function-

(Concluded on Page 8)

Recalling the So-Called Good Old Days

With inflation pumping the cost of living ever higher, people tend to think nostalgically of the old days, only to recollect perhaps that making a living was a struggle even then.

Recently, while going through the contents of a little-used storage room in the basement of the MGH's Moseley Building before the structure was torn down to make way for a new Ambulatory Care Center, a hospital employee came upon a ledger dating to the opening of the hospital in 1821.

On the pages of the account book in beautiful penmanship, a bookkeeper had documented the initial daily expenses of the new institution.

Although the pages were brown with age and delicate to the touch, the clarity of the text had not dimmed.

The book listed such purchases as butter, 15 cents per pound; bread, 8 cents; coffee, 29 cents per pound; milk, 3 cents; a pound of sugar, 11 cents; pork, 10 cents per pound; and flour, 4 cents a pound.

The impressiveness of the "bargain" prices available during America's early days quickly gave way to reality as

the examiner noticed these entries:

"Martha Rice entered my employ this day as Chamber Maid at \$6 per month.

"Mary Young entered my employ this day as Cook at \$6.50 per month."

For 27 days' labor as a nurse during the first month of the hospital's operation, Elizabeth Bryant earned \$6.31.

In 1921, at ceremonies marking the 100th anniversary of the MGH opening, Dr. Henry P. Walcott, then President of the Hospital Corporation, cited records showing that in 1832 the weekly cost of a patient's stay was \$4.62.

Pointing out that expenses had gone up, he said that "in the last report of the trustees of this hospital, the cost of a house patient is stated to be \$5.70 per day," but he hastened to add, "Not a cent of that money is wasted."

Although the bill for providing hospital services has continued to rise, in company with increases in all other segments of the economy, the MGH maintains a constant drive to hold costs down (*MGH News*, April 1978).

Its semiprivate daily room rate reached \$198 on October 1, reflecting

Boston June 22 1821.

Paid for 1 lb. P. H. Seal	42
Paid for 1 bush. Beans. at 12 1/2 per bu	1 12
Paid for 1/2 lb. Fish. at 40 per lb	1 20
Paid for 3 lb. Butter	12
Paid for 1 lb. Sugar	11
Paid for 1 lb. Coffee	29
Paid for 1 lb. Milk	3
Paid for 1 lb. Pork	10
Paid for 1 lb. Flour	4
Paid for 1 lb. Bread	8
Paid for 1 lb. Butter	12
Paid for 1 lb. Sugar	11
Paid for 1 lb. Coffee	29
Paid for 1 lb. Milk	3
Paid for 1 lb. Pork	10
Paid for 1 lb. Flour	4
Paid for 1 lb. Bread	8

an increase of five percent, well under the economy's inflation rate of 13 percent. Efforts to save have kept MGH charges well under those of many other teaching hospitals.

One expense listed in that 1821 ledger would surely raise eyebrows today. The entry read:

"Paid for 2 gallons Brandy for the Sick @ \$1.33 \$2.66." ■

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Strain on Child May Affect Entire Family

(Concluded from Page 7)

ing at the appropriate age level," explained Dr. Jellinek, who is Instructor in Psychiatry and in Pediatrics at Harvard Medical School. "How is the boy or girl functioning in school, with family and friends, and in play? And what about moods? If we found consistent problems in one area, we would be concerned. If we found consistent difficulties in more than one area, we would be quite worried."

For every child suicide that takes place in this country, Dr. Jellinek estimates there are 10 to 50 suicide gestures by youngsters.

"The circumstances surrounding the incident are very important," he said. "Did a child who took pills know how dangerous the pills were? Did he consume all or half? Did he carry out his act while alone in the house, or was his mother in the next room? Some moves toward suicide are desperate calls for help."

Young children, aged 8 or under, often do not view suicide as an act ending life, but, rather, as a way to get back at someone. Frequently they

are unable to express their feelings verbally. Thus, they resort to an action.

Judging whether an event was accidental or a suicide often is difficult. Dr. Jellinek spoke of a youth who, several days after a breakup with his girl friend, ran across a road, jumped over a wall, and plunged 40 feet, injuring himself. The youth said that he thought there was a path on the other side of the wall, but he did not look. Instead he took a foolish risk which, if fatal, could have been recorded either as an accident or a suicide.

For many children hospitalized with serious chronic diseases, advances in technology have prolonged their lives but also have been accompanied by rising emotional stresses, both for the patients and their families.

The strain on families is particularly evident as they await the outcome of lifesaving efforts in the MGH Neonatal Intensive Care Unit.

"The uncertainty over the fate of an infant is not resolved in a matter of hours," said Dr. Jellinek. "The outcome can be in doubt for days, even weeks, and then recovery may take months. The seemingly endless waiting

can destroy a family's cohesiveness."

Since nurses, residents, and social workers are primary contacts with the families, the psychiatric consultant spends much time with these professionals, discussing specific patient and family problems and the support that could be given.

Dr. Jellinek had special praise for the nurses. "They undergo a tremendous amount of stress," he said. "A nurse may have to sit hour after hour with a baby who is vomiting or otherwise in distress. Or she may sit with parents whose child is lying near death."

Whenever a child undergoes psychiatric therapy, either on an inpatient or outpatient basis, there is contact with the family by a social worker. Dr. Jellinek pointed out that actual treatment usually takes only one hour a week. "This effort must be carried over into the home," he said, "because unless you can change some basic family patterns with the help of the social worker, you are going to lose the overall battle. Teamwork is necessary to maintain the impact of the therapy."

The Child Psychiatry Service hopes to encourage pediatric house officers to become more involved in the psychological problems of patients and their families. A pediatrician, the Service feels, is fully capable of conducting basic counseling for emotional disturbances.

Meantime, in the training of residents on the hospital's adult Psychiatric Service, the focus on the patient is being widened to recognize parental status. Dr. Jellinek said that too often the psychiatrist treating an adult patient will forget that he is also a parent and that his depression may well be affecting his children, requiring help for them too.

Although the numbers of children in need of psychiatric care are rising, interdepartmental cooperation at the MGH has provided a start to help meet those needs. ■



Seven-year-old Raymond Bailey of Sterling, Mass., listens intently as Dr. Jennifer Rathbun, MGH child psychiatrist, makes a point. Raymond suffered severe hand injuries in a lawn mower accident.



MGH News

Vol. 38 No. 9

MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS

December, 1979

Health Drive Opens With Assist for Heart Patients

Diagnosing Breast Cancer With Ultrasound

A 39-year-old woman faced surgery at the MGH after examination of her breasts by a physician indicated the presence of a potentially malignant lump.

Before going to the operating room, however, the patient underwent a test called xeroradiography, a form of mammography (breast X ray).

The test suggested that the lump was harmless (benign), but the evidence was inconclusive. As a follow-up, the radiologist used ultrasound.

The second procedure revealed a cyst (a fluid-filled sac). Employing a needle, the patient's surgeon withdrew the fluid, and the lump disappeared. After analyzing the fluid in the hospital's cytology laboratory, a pathologist confirmed the benign nature of the mass. Surgery was not required.

Based on the principle from which the underwater detection system called sonar evolved, ultrasound scans interior parts of the body with high frequency sound waves and can detect a variety of conditions such as an inflammation, foreign body, the formation of a tumor, and, in pregnancy, future multiple births.

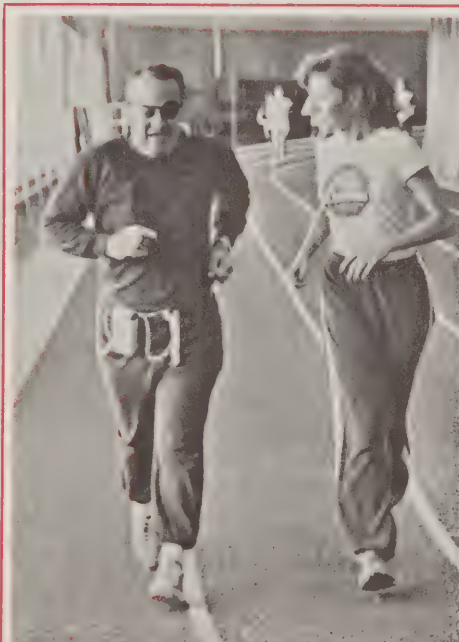
Echoes from the projected sound produce an image on a screen, permitting visual analysis (*MGH News*, June-August 1974).

Within the last few years, the non-invasive technique has proved increasingly valuable as a complement to mammography both in diagnosing and ruling out the presence of breast cancer, the most common cause of death among women between 40 and 65.

"Mammography lets us see a growth, characterize its contours, and determine whether any calcium deposits are associated with it," said Dr. Daniel B. Kopans, Chief of the Xerography Breast Imaging Section of the MGH Radiology Department. "From that information we can usually make the diagnosis that something is benign or malignant."

Ultrasound permits a more definitive diagnosis by enabling the doctor to characterize the inside of the mass. Is the lump filled with fluid or is it solid? A cyst almost invariably turns out to be benign. Although most solid masses

(Continued on Page 2)



Offering words of encouragement, Kristine Nelson, RN, jogs with George Douglass during cardiac rehabilitation exercises at Harvard's indoor track.

At first walking, Charles Nowiszewski gradually broadened his strides and then, with encouragement, confidently broke into a slow trot along the springy surface of Harvard's new indoor track.

As he jogged, the 49-year-old Cambridge, Mass., engineer was keenly aware of electrode wires extending from his chest to a gray case, slightly smaller than a paperback book, which hung from a belt around his waist.

The device, a telemetric radio transmitter, monitored Mr. Nowiszewski's heart and continuously relayed signals to a nearby receiver which converted them into a diagram of his heart's electrical activity (electrocardiogram), appearing both on a screen and on a paper strip. The receiver also flashed numbers showing the jogger's heart rate.

Mr. Nowiszewski had been admitted to the MGH last June following a mild heart attack. After only 10 days, his condition improved sufficiently to permit his discharge. Now, hoping to strengthen his cardiovascular system, he is participating in a new MGH program.

The Cardiac Rehabilitation Program conducted at the hospital and at the Harvard track is a pilot project inaugurating the MGH Center for Health Enhancement.

Conceived by Dr. Alexander Leaf, Chief of Medical Services at the MGH, the Center is also directed by him. Its purpose, he said, is to develop programs that enhance personal health and reduce death and illness by promoting good living habits. Special emphasis is placed on cardiovascular disease.

(Continued on Page 4)



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EDITORIAL:

Women Marathon Champions?

Women's liberation has spawned uneasy feelings in even some of the more confident of men. With Janes and Joans invading the marketplace and competing for even top positions, the male ego is being stressed as never before. One bastion long thought inviolable was sports. While females might rival the male in brain, no self-respecting male would concede the potential for a struggle on the athletic field. After all, men are typically taller, broader, and eminently more muscular.

Then Billie Jean King deflated Bobby Riggs on the tennis court. Sure Mr. Riggs was a superannuated hustler, not a modern-day tennis professional. Still, Ms. King dented slightly the armor of invincibility.

Will that armor ever be penetrated? Most men would probably say no. In body-contact sports the male ego seems generally safe. At best a tradition of training and perseverance in woman's athletics is unlikely to produce a decade or two from now more than an occasional interloper in, say, the National Basketball Association. The possibility of women playing on regular teams in the National Football League seems remote indeed—even if that step were permitted.

What about track? In field events like the discus or hammer throw, the male physique gives him a tremendous advantage. His physical endowments probably rule out many women breaking into the sprints, hurdles, and shorter runs. The marathon, however, may be a special case. Some believe that women have a major *advantage* in long-distance running. Their greater store of adipose (fat) tissue, the theory goes, provides a reserve fuel tank the body can tap as the miles pile up. Many, however, discredit this theory for a variety of reasons. In fact, a number of observers state that even in distance running men maintain an advantage because of strength and because of the amount of blood their hearts deliver to exercising muscles per unit of time (cardiac output). Even so, the best marathoners are lean and often stand roughly 5 foot 8 inches high, not that much taller than the average American woman. Does that indicate that their size should propel women to at least competitive parity?

Theory, though, is one thing and performance another. Many male marathoners rested smug in the knowledge that no woman had ever run a championship caliber race. Now, too, that thought has disintegrated with the good performance even by male standards achieved by a woman this fall in the New York Marathon. Not near a winning time this year, but in the future the Boston Marathon champion may be named Jane or Joan.

Screening Programs Might Lead to Early Breast Cancer Care

(Continued from Page 1)

are benign, they are viewed with a higher degree of suspicion.

"If we see a solid lesion by ultrasound, we recommend removing it," Dr. Kopans said. "Our experience with ultrasound is not yet great enough to make us completely confident which solid lesions we can safely leave alone."

He said that 96 percent of any cancers in the breast will be found through the combination of a self-examination, inspection by a physician, and a mammographic study.

While medicine has taken long strides against some forms of cancer, the mortality rate from breast cancer has not changed in the past 40 years. About 33,000 women die from the disease annually as 100,000 new cases are being recorded.

"There is hope that chemotherapy [drug treatment] will start to make a dent in the mortality figures, but at this time early detection seems to offer the best hope of improving survival," Dr. Kopans remarked.

Screening programs provide the speediest way of accomplishing early detection, but even though mammography involves exposure to a very low dose of radiation, many women have been frightened by articles about the theoretical risk of developing breast cancer from X rays.

Studies have shown that in females past puberty the breast is the organ most sensitive to cancer caused by high doses of radiation. The theoretical risk from low levels of radiation is so small that there is no way to prove whether low doses of radiation will ever cause a case of breast cancer.

Physicians, however, have adopted a cautious approach and continue to weigh the theoretical risk against mammography's proven ability to detect breast cancer at the earliest possible stage. Present guidelines suggest that mammography is appropriate in any symptomatic or high-risk woman but should not be performed routinely on asymptomatic women under 35.

As one alternative, diagnosticians

Photography: Pages 1, 3, 4, 5, Myron Daniels; pp. 6, 7, courtesy of Harvard Sports News Bureau; p. 8, courtesy of Dr. William H. Harris.



As Miss Sandra Pellerin, a registered diagnostic medical sonographer, maneuvers ultrasound probe on patient's breast, echoes from the machine's projected sound produce an image on a screen.

uation. But in examining the breast, the physician must be alert to tumors of perhaps half a centimeter (less than a quarter of an inch) in diameter. The smaller he can find them the better.

"You can't tolerate skip areas," Dr. Kopans stressed. "You have to see all of the breast tissue, and since the breast is a gelatinous structure, it may move when the scanner's contact probe touches it."

Equipment to overcome this has already been installed at the MGH. The new ultrasound device requires no contact whatever with the patient.

The patient lies face down on a bed. An opening permits her breasts to be immersed in a tank of water under the bed. The ultrasound transducer, situated at the bottom of the tank, can then scan the breasts without touching them. The sound waves and returning echoes travel uninterrupted through the water.

This method assures a check of each breast in its entirety and without the distortion that a contact probe might produce. Since the tank water is preheated to body temperature, the patient experiences no discomfort. The tank is also out of view.

"At this time, we have no idea whether ultrasound is as sensitive or as accurate as mammography," Dr. Kopans emphasized. "Trials will have to be carried out with thousands of women before that determination can be made. Breast cancer strikes 1 out of every 13 women during their lifetime. If breast ultrasound proves that it can stand on its own, it will be an important step toward checking the most common form of cancer in women." ■

have used an infrared technique called thermography to scan the breast for evidence of increased heat which cancer activity can generate. But although thermography does not involve radiation, the procedure is no longer accepted at the MGH because the results have proved to be too inaccurate and non-specific.

Would ultrasound, which also has no link with radiation, qualify as a proper screening method? "We don't know," said Dr. Kopans, who is an Instructor in Radiology at Harvard Medical School, "but we hope to find out."

A study is being undertaken at the MGH whereby each patient with a suspected breast tumor will undergo examination by a physician, by mammography, and by ultrasound. The result of each study will be interpreted separately, and then compared objectively by an independent source.

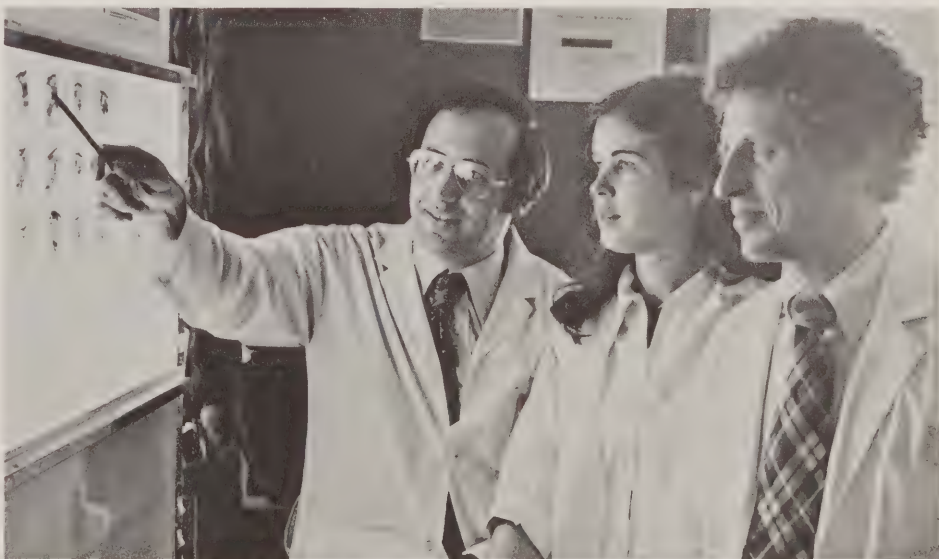
A breast cancer may grow for 7 to 10 years before being felt as a lump. Mammography will perceive the cancer as long as two years before its presence becomes evident, particularly in post-menopausal women whose breast tissue is much less dense than that of younger women.

During the past nine months, however, ultrasound scans were conducted on 81 MGH patients whose mammographic examinations proved inconclusive. Ultrasound provided the correct diagnosis in 80 percent of the patients and was wrong in only four percent. In the remaining cases, only a surgical

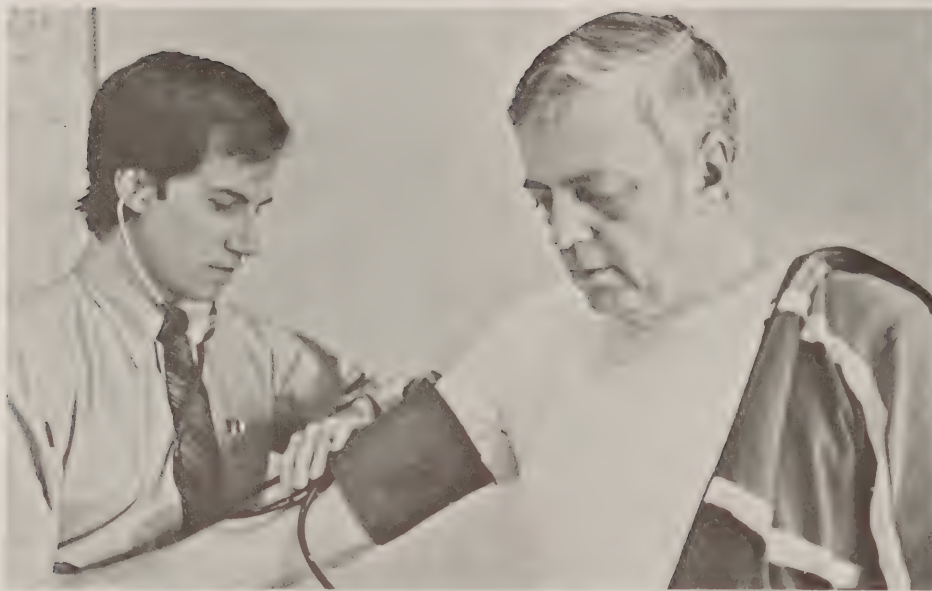
procedure could furnish a definitive diagnosis.

To date, ultrasound tests have been carried out with a contact type of scanner that is useful in studying masses detected by physical examination or mammography. A successful screening test requires a survey of the entire breast in a short period of time. The standard contact scanners are unable to meet the necessary requirements.

Dr. Kopans added that the present equipment is fine in diagnosing abdominal problems, for example, because the organs are fixed and the physician is looking for lesions large enough so that if he missed a centimeter or two it would make no difference in the eval-



Dr. Daniel B. Kopans, left, discusses patient's ultrasound breast image pattern with Mrs. Jane A. Kelley, ultrasound supervisor, and Dr. Eric vanSonnenberg, MGH radiologist.



Before morning's exercise session begins at Harvard track, Dr. Albert G. Mulley checks blood pressure of program participant Charles Nowiszewski.

Striving to Improve the Heart and Lungs

(Continued from Page 1)

Following careful evaluation of the patient's health status, the pilot project provides three months of graded exercise three mornings a week at Harvard. A physician, cardiac nurse specialist, and physical education instructor attend and often join in each workout. In addition, counseling for the patients is offered at the hospital.

Ultimately, the Center expects to offer patients a live-in facility away from the MGH campus. While combining exercise with diet and other changes in life-style, the patients will live for periods up to four weeks in what Dr. Leaf termed "conditions designed to improve cardiovascular and pulmonary functioning." Valuable research data also will be collected.

Physicians have long debated whether measures such as exercise and proper diet simply make a person feel better or whether they actually reverse some process that is damaging the heart or blood vessels.

Instead of just reducing or eliminating individual risk factors such as stress, smoking, obesity, and the like, Dr. Leaf's intention is to make as good as possible a patient's entire environment and observe whether lasting improvement has been achieved.

A patient qualifying for the pilot rehabilitation program may be recovering from a heart attack or from heart surgery. Or the individual may be someone with stable coronary artery disease whose fitness should be im-

proved, or he or she may have risk factors for coronary artery disease, such as high blood pressure, high blood cholesterol, diabetes, or obesity.

Because of limited facilities, program participation is restricted for the present to 15 people.

Three MGH internists who also have appointments at Harvard Medical School, Drs. Harvey B. Simon, Steven R. Levisohn, and Albert G. Mulley, supervise the program along with Miss Kristine Nelson, RN, an MGH cardiac clinical nurse specialist who formerly served as a unit teacher in one of the hospital's Coronary Intensive Care Units. Miss Lori Sparks, who has a



With Kristine Nelson, RN, setting the pace, exuberant Chadwin Georgio stays within his prescribed exercise limits.

master's degree in physical education, rounds out the team.

Enrollment in the project begins with a patient's referral by his private physician. Miss Nelson then meets with the patient to discuss the program and to arrange two vital medical examinations, a cardiac stress test and a lung study.

The stress test in the hospital's Treadmill Exercise Laboratory, supervised by Drs. Timothy E. Guiney and Howard Hartley, pinpoints the upper limits of the patient's heart rate (*MGH News*, November 1976). A percentage of that maximum can then be prescribed as a "target range" during exercise.

In the Pulmonary Function Laboratory of Dr. David J. Kanarek, the patient undergoes other tests while pedaling a stationary bicycle to determine such factors as maximum breathing capacity (*MGH News*, December 1978).

After evaluating the patient's test results, one of the MGH team physicians will then examine him to assess his overall readiness to engage in an exercise regimen. Throughout the program, an advisory group of medical specialists stands ready to assist in resolving any problem.

"There are definite situations that rule out exercise training," Miss Nelson pointed out. "If during their exercise testing, patients suffered life-threatening arrhythmias [irregular heartbeats] or a decrease instead of an expected increase in blood pressure, they would probably be disqualified."

Once allowed onto the track (for heart attack patients, not until 10-12 weeks after their attack), the exercise participants strive to achieve a so-called training effect. That is, by engaging in an activity regularly over a period of time, the patient would find himself able to perform the same task at a lower heart rate and lower blood pressure than when he started, thus increasing exercise capacity.

Patients take their own pulse and note the rate five times during each morning session which lasts an hour and a quarter. They record the figure on arrival at the track, after 10 minutes of warm-up calisthenics, twice during jogging, and after cool-down exercises.

Dr. Levisohn emphasized that while sophisticated monitoring equipment serves as safeguards "we don't want the patients to become dependent on these devices. The thrust of the program is to encourage independence as the individuals achieve greater levels of

performance."

Dr. Levisohn said that fear which besets many participants at the beginning quickly gives way to confidence and satisfaction. They soon look forward to the next exercise session.

In the event of an emergency, necessary equipment (such as a defibrillator, aspirator, and breathing-assist bag) as well as various medications are kept within quick reach.

"The referring primary physician is kept abreast of how his patient is doing and remains always in control," Miss Nelson stressed. "We don't change any diets or medication which the primary doctor may have prescribed, although we may offer recommendations. We send him the EKG strips, and even pictures showing the patient exercising."

Miss Nelson encourages patients to consult with her about any individual problems they may have, such as continued periods of depression about their illness. Appointments are made with her at the MGH Ambulatory Care Division (726-8248).

While patients wait to participate in the track program, Miss Nelson maintains weekly telephone contact with them.

She is presently drawing up plans for periodic evening sessions which patients and their families may attend at the clinic. Talks will be given on such topics as coronary disease, risk factors, how to stop smoking, the importance of diet, and the concept of exercise.

She also plans to offer instruction in cardiopulmonary resuscitation. "Relatives of cardiac patients should know the technique," she said.



Calisthenics comprise an important part of the cardiac rehabilitation program.

The reliance on exercise, diet, and other changes in life-style to help patients overcome cardiac disease applies equally to such related disorders as diabetes beginning in adult life, high blood pressure, and obesity.

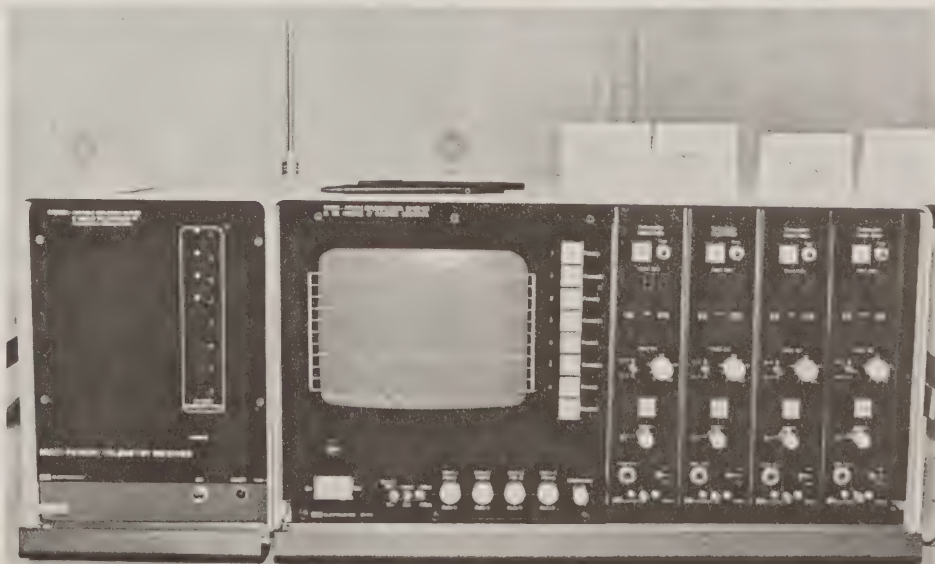
While heart attacks strike more than one million Americans each year, taking more than 600,000 lives, some two million people in this country have to contend with adult-onset diabetes. One of every four individuals over the age of 60 has high blood pressure. And obesity is all around us.

"Our hope is that as we gain experience in rehabilitating heart patients we'll also be able to help people with these other conditions," said Dr. Leaf.

Success of these programs, Dr. Leaf

pointed out, could ultimately lead to primary prevention, "helping the offspring of individuals with chronic ailments of these types, children who might very well be subject to the same diseases in later life. If we changed the life-style of these youngsters early enough, we might actually reduce the incidence of some of these disorders, though that remains to be proven." (MGH News, March 1976).

Dr. Leaf admitted that the goals are ambitious ones. "We're starting rather humbly," he said, "but if we can learn not only how to cure disease but also how people can stay healthy, preventive medicine in this country will advance significantly." ■



During the exercise program, most of the participants wear a radio transmitter at their waist. The device relays electrical signals from the heart to a receiver which then translates them into an electrocardiogram and a heart rate.



Many intercollegiate rivalries have developed among women in athletics such as this crew race between Radcliffe and Yale.

Women Assume More Active Sports Role

On October 21, Bill Rodgers outpaced 11,532 distance runners to win the New York Marathon for the fourth time. But as dramatic as was his victory in 2 hours, 11 minutes, and 42 seconds, he had to share accolades with a 26-year-old teacher from Norway.

Grete Waitz not only topped a field of 1,800 women in the race but in covering the 26-mile, 385-yard course in 2:27.33, she also broke her own women's world record for the distance.

Only 15 years ago, the women's marathon record was one hour slower!

In those days ladies generally were content to occupy the role of observer. Participation in so grueling a sport as distance running was regarded as not only too punishing but unladylike as well.

"Just as women today are achieving equality with men in business, in academic life, and in social status, so are they asserting their rights in sports," said Joanna Bunker Rohrbaugh, Ph.D., a psychologist in the MGH Psychiatry Service.

The evidence is clear. In a recent five-year period, the number of girls competing in high school sports multiplied more than five times. In the past eight years, the number of women athletes on college campuses has nearly tripled.

The 1972 federal law banning sex discrimination in education served as a major stimulus for this dramatic rise. On issuing guidelines in 1975 to implement the law, the government emphasized that the statute included equal opportunities for women in school

athletics.

"Many long held myths about the role of women in sports also are disappearing," Dr. Rohrbaugh declared. "For example, it's no longer considered unfeminine for women to engage in strenuous competition. And studies have shown that female athletes need not fear that they'll develop Amazon-like physiques."

In a book she authored, *Women: Psychology's Puzzle*, published last month by Basic Books, Inc., of New York, Dr. Rohrbaugh wrote that even in weight-lifting programs the major changes in body composition for women involve decreases in body fat rather than greater muscle development.

Despite the more liberal public attitude toward female athletes, a good many, nevertheless, admit hang-ups about how their competitive role is perceived by others.

In her book, Dr. Rohrbaugh, an Instructor in Psychology at Harvard Medical School, quoted a well-known female long-distance runner as conceding, "I always worry about looking nice in a race. . . . A lot of us try, subconsciously maybe, to look as feminine as possible. . . ."

For this reason also, women tend to choose such sports as gymnastics, swimming, golf, and tennis over activities which may involve body contact, such as basketball, volley ball, and field hockey.

Most women prefer to compete against members of their own sex and especially shun mixed competitions in which physical contact or strength con-

tribute to the outcome.

"Mixed rivalry, where possible, does bring home the point, however, that men and women are equal in a lot of ways in sports and that it's not the end of the world for a man to be beaten by a woman," Dr. Rohrbaugh pointed out.

"I think particularly that if children growing up were encouraged to compete in a mixed sex setting, it would do something positive for the relationship between the sexes."

In the past 10 to 15 years, she said, the gap between male and female times in Olympic swimming events has narrowed markedly.

In fact, she declared, a study has shown that while a boy can throw a ball farther than a girl when both use their dominant hand, the difference in distance becomes almost negligible when each youngster tosses the ball with the nonpreferred hand.

The theory is that practice since childhood probably led to the boy's prowess with his dominant hand. While girls in the past have been discouraged from engaging in strenuous physical play, boys always have been expected to exhibit gross motor behavior such as running, jumping, and throwing.

Research on the nature and extent of injuries suffered by women in athletics has provided only preliminary data thus far, but sprained ankles, knee injuries, and bruises appear to be the principal complaints. Injuries to the breasts are least common.

As increasing numbers of women take up sports, concern has risen about one problem. In certain individuals, rigorous training has led to a disruption of menstrual cycles, even abnormal cessation of the cycle (secondary amenorrhea).

Investigators claim that when women lose between 10 and 15 percent of their total body weight, they also lose about one third of their body fat, and that when this happens, the menstrual cycle "turns off." Reduced intensity of training and increased nutrition usually result in a return of the cycles.

Emotional or physical stress may also play a leading role in causing menstrual disturbances.

When the first women to enroll as cadets at West Point arrived in July, 1976, a survey among 70 of them disclosed that 86 percent menstruated regularly each month before entering the academy. After only a month of

China Welcomes Western-Style Medicine

In pursuing a new course of friendship and mutual cooperation, the United States and the People's Republic of China have given high priority to the sharing of medical knowledge.

Since 1971 when the People's Republic opened its doors to Americans for the first time in a generation, numerous exchange visits have taken place between leading physicians of the two countries.

Speaking recently at an MGH Medical Grand Rounds, the Vice-Chairman of the Department of Medicine at Shanghai's largest hospital had high praise for the technological advances he had seen in American health care.

"We have achieved much in the past 30 years," said Dr. Hsu Chia Yu of the Second Shanghai Teaching Hospital, but he added, "We still have a lot of catching up to do."

He said that in its effort to provide China's one billion people with the best possible health care system his government looks forward to combining western medicine with his country's traditional ways of treating the sick.

Just two weeks after Dr. Hsu's talk, Dr. Charles A. Sanders, MGH General

Director, led an 11-member MGH medical delegation from a variety of fields and an M.I.T. specialist to China to promote the scientific and technological exchange between the Chinese Medical Association, the Chinese Academy of Medical Sciences, and the MGH.

Earlier this year Dr. Sanders was part of a small group that went to China to discuss a potentially major educational exchange. Later a high-level Chinese delegation involved in the planning spent five weeks in the United States, two of them at the MGH.

Dr. Hsu, educated at an American-operated university in Shanghai prior to the revolution, came to the United States earlier this year to be the first Edgar Snow Visiting Professor of Medicine at the University of Missouri in Kansas City.

Toward the end of his planned six-month stay in the United States, Dr. Hsu visited the MGH for two weeks as guest of Dr. Edgar Haber, Chief of the hospital's Cardiac Unit.

In his address to MGH staff personnel, the visiting physician remarked

that 80 percent of China's population live in the countryside and are treated for minor ills by "barefoot doctors."

Neither barefoot nor doctors, they are workers who have been trained to respond to routine medical needs in areas having few physicians. After an initial six months of instruction, they continue their education with periodic visits from professional teams dispatched by major health centers.

"The population of my country is really too huge," Dr. Hsu said, "and we are trying very hard to control the growth. For example, in China now we advocate one child per family."

When a husband and wife without children retire, they qualify for 100 percent of their income as a pension. A couple who had one child receives 85 percent of their income, and a couple who had two, 75 percent. No provisions are made for husbands and wives with larger families.

"I have three children," Dr. Hsu said, "but doctors in China are not expected to retire anyway."

Many of America's most serious medical problems do not extend to China. Although the incidence of stomach cancer among the Chinese is

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physical conditioning drills, 73 percent reported their menstruation had discontinued. As time passed, the cycles resumed for most.

Dr. Janet W. McArthur, an MGH gynecologist, told of a patient who was a runner and had not menstruated for two or three years. "Then one day she developed tendonitis," Dr. McArthur reported, "and had to stop running for a few weeks. Her menstrual cycles quickly started up again."

Rigorous exercise also has been linked to delays in menarche, the first occurrence of menstruation. Among ballet dancers in particular, physicians have noticed that girls who begin severe training programs at about the age of 8 may not begin menstruating until they reach 16 or 18.

"Such delays may be a good thing," Dr. McArthur theorized. "Maturing physically at too young an age can be harmful to the psyche of children. By this sort of hard exercise, which girls are imposing upon themselves, maybe they're buying more time to mature. If we could be sure that all of these disturbances to the reproductive cycle are reversible, we wouldn't have to

worry so much."

Dr. McArthur, who is Professor of Obstetrics and Gynecology at Harvard Medical School, hopes at least some of the mystery surrounding menstrual problems among women athletes will



Women can compete in strenuous athletics today without being labeled as unfeminine.

be cleared up by a project under way in Cambridge, Mass.

With Dr. McArthur and Rose E. Frisch, Ph.D., of the Harvard School of Public Health, serving as coprincipal investigators, an 11-member, multidisciplinary team has begun studying the effects of physical training, nutrition, and the stress of competition on the menstrual cycles of volunteer Radcliffe College students.

The participants from Harvard's sister school are members of several varsity teams, including track and field, cross-country running, and swimming.

"With these volunteers," Dr. McArthur said, "we hope to document just what they experience as their training increases in severity and as they move into actual competition."

The women's record time of 2:27.33 posted by Grete Waitz in the New York Marathon was better than the winning times of half the past male Olympic victors. But when the games are held in Moscow next year, the marathon will still be an all-male event.

The longest race authorized for women competitors in the Olympics spans just under one mile. ■

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Chinese Record Gains Against Disease

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substantial, they experience much less lung, colon, breast, and pancreatic cancer than do Americans.

Dr. Hsu said that at his hospital, which has 1,150 beds and treats 4,000 outpatients daily, only about 70 episodes of acute heart attack are encountered in a year's time.

"The incidence of coronary heart disease is very much lower, perhaps three times lower, than in the United States," he said.

He explained that the eating habits of the Chinese are much different from those of Americans. The diet in China is largely vegetarian.

Dr. Hsu confessed that during his American visit he could not adapt to the western-style diet and began to cook his own Chinese food.

The doctor also mentioned exercise:

"Here, you go everywhere by car while I, at home, usually travel everywhere by bike. I regard my bike as my Mercedes-Benz."

In treating coronary heart disease, Dr. Hsu said Chinese physicians use traditional western medications, and also herbal drugs. "Digitalis, of course, comes from the foxglove leaf," he pointed out.

At one time, schistosomiasis, a parasitic disease spread by snails in water, posed a serious threat to health in more than a dozen Chinese provinces. Today, according to Dr. Hsu, the disorder is almost totally eradicated.

He added that China has no venereal disease, alcoholism, or drug abuse.

At the Second Shanghai Teaching Hospital, surgeons have performed heart, liver, and kidney transplants. The medical staff also is learning all it can about burn care and the replantation of severed limbs, the latter a specialty in which China has done significant pioneer work beginning less than one year after the MGH.

Dr. Hsu spoke enthusiastically about

acupuncture, the traditional Chinese practice of piercing specific nerves with needles in an effort to cure disease, relieve pain, or induce anesthesia for surgery.

He mentioned one acupuncture study conducted at a leading institute of neurophysiology in Shanghai. Scientists using needles elevated the pain threshold of a laboratory animal, then drew blood from it and injected the blood into another lab subject. Dr. Hsu said the second animal developed the same protection against pain as the first. Efforts to explain the phenomenon are being made.

One American physician curious about acupuncture was the late famed MGH cardiologist Dr. Paul Dudley White. He was one of the first four American physicians to visit China when the Bamboo Curtain lifted in 1971, and he had an opportunity to witness operations involving acupuncture as well as the quality of rural health care. He came home impressed but admitted, "I told the Chinese doctors they smoke too much."

Another member of the American delegation was Dr. Victor W. Sidel, Chief of Social Medicine at the Monte-

flore Hospital and Medical Center in New York, and formerly of the MGH.

In November of 1972, a delegation of Chinese physicians visited several cities in the United States, including Boston. While they were at the MGH, Dr. White served as host to the group, the first ever in America from the People's Republic.

Since then, the doors of both the People's Republic and the United States have stood wide open, admitting many medical professionals to lecture, to advise, and to exchange ideas.

Nearly a dozen groups from the new China have visited the MGH, and an even larger number of delegations of MGH physicians and other professionals have been guests of mainland China medical institutions.

Sometime soon doctors from the People's Republic are to begin advanced training as Fellows at the MGH.

Last February an MGH representative traveled to the Asian nation with a dual purpose. Dr. John T. Truman, MGH Chief of Pediatric Hematology, lectured in several cities on blood disease and cancer. While visiting the Capital Hospital in Peking, he also treated a 10-year-old child suffering from a very unusual type of leukemia. ■



Acupuncture needle in the cheek of this patient in a hospital in the People's Republic of China has produced an apparent anesthetic effect, permitting head surgery.



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January–February, 1980

New Geriatrics Unit Guides Medical Care of Aged

On Matters of the Heart

Advances in tools to diagnose heart disease have developed rapidly in the last few years. The following article summarizes some of the important procedures now available. [EDITOR'S NOTE.]

A 47-year-old salesman, anxious to take up jogging, heeded advice he had read and sought a medical checkup to make sure that he could run safely. The precaution may have saved his life.

In the doctor's office, the salesman, who led a rather sedentary existence, admitted that he had recently experienced some chest discomfort, but he claimed he now felt fine.

Because of this discomfort, however, the physician arranged a stress test to determine the maximum capacity of the patient's heart during exercise.

As the salesman walked on a treadmill, a cardiologist measured his blood pressure and monitored an electrocardiograph, which recorded the electrical activity of his heart.

After only a modest amount of exercise, the electrocardiogram (EKG) showed a profound change in the heart action. A second test, a nuclear imaging scan, confirmed a marked cardiac abnormality.

The scan, pioneered by several research centers including the MGH, involved injection into the patient of a weak radioactive solution containing a substance (the isotope thallium-201) just before he finished exercising. Later, as he lay under a nuclear medicine camera, specialists sought and found sizable areas of the heart where

the thallium could not concentrate, thus indicating the presence of tissue that was being deprived of adequate blood flow.

To document the severity of the disease, the doctors performed an angiogram (an X ray of blood vessels after injection of contrast material to show them). The patient turned out to have severe blockages in two major coronary arteries.

He was enrolled in a very closely supervised exercise program, marked

(Continued on Page 6)



Carlos Gooden, who helped pioneer the MGH foster grandparents' program, has demonstrated a special knack for making friends in the Children's Service. (Story on page 4)

When the United States was founded a little more than 200 years ago, only 20 percent of newborns reached old age. Today, the reverse is true. Eighty percent of newborns live to old age. And the survival rate is mounting.

According to a recently issued federal report on aging, Americans over 65 are expected to increase in number from the nearly 25 million now to 32 million by the year 2000 and to 45 million by 2020.

"All age segments of the elderly population are expected to grow rapidly," the report said, "but particularly the extremely aged, so that in the year 2000 there will be about 17 million persons 75 and over and about 5 million who are 85 and over."

While today's medical care sometimes prolongs lives, it does not always assure healthier lives.

The report on aging points out, for example, that a confused, elderly person might be deemed senile when, in fact, the disorientation might result in part from an unrecognized medical condition. Properly diagnosed, the condition of the "senile" patient sometimes improves surprisingly.

A growing awareness in the last few years that marked differences may exist between some medical problems of the aged and those of younger adults has sparked a drive for greater physician emphasis on the elderly.

The MGH is taking part in that effort. Dr. Alexander Leaf, Chief of Medical Services, has established at the hospital a Geriatrics Unit to provide expertise for the care of older patients, to detect and investigate any special difficulties they may have, and to bring their needs into the mainstream of med-

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EDITORIAL:

Evaluating the Nation's Doctors

"What makes the MGH such an outstanding hospital?" Often that question comes up when someone finds out that a person works at this institution. The first response might well be another question: "How do you know the MGH is an outstanding hospital?" There really is no easy answer to the question of whether one hospital is better than another.

Better in what way? Accommodations? Equipment? Personnel? Enthusiasm? Tradition? Training? Research? Patient care? Of course, patient care, but what goes into it? All of the above. But which factors are most important, and how do you evaluate them?

The answer is that hospitals are too complex to analyze and reach any definitive ranking. Yet, in recent years at least two major attempts were made. One polled physicians; the other, "experts" on hospitals. In both, the MGH finished first among the nation's hospitals.

One aspect in which the MGH lags behind many institutions is in its physical plant. While some buildings are new and first rate, others date to as long ago as 1821. If there is one area in which this hospital especially strives for excellence, that lies in seeking the best qualified, most caring employees.

A page 7 article in this issue describes one category of toilers in the vineyards of American hospitals: the doctors. That so many MGH physicians are said to rank among the very best in the country is reassuring. A spot check of the book in question indicates that the MGH may have more doctors so listed than any other hospital in the nation.

Like many surveys of hospitals, this rating of doctors has to be considered a large-scale and well-intentioned, but imperfect attempt. For one thing there are many top specialists whose names are unaccountably omitted. For another, the book omits generalists. Many of the most outstanding doctors in the United States are internists or the like whose more "general" specialties the book fails to list.

Whatever the validity of the physician evaluation, the results are gratifying to those who do their best to attract to these walls the most capable patient caretakers.

Geriatrics Unit Chief Lauds British Way Of Treating Aged

(Continued from Page 1)

ical attention. The Medical Foundation, Inc., of Boston, awarded a grant to help launch the program.

"Although confronted with an endless stream of sick, elderly patients, most physicians have not been inclined to focus on the problems of the aged," said Dr. Leaf, who is also Jackson Professor of Clinical Medicine at Harvard Medical School.

"This can be changed by the development at major medical centers of highly visible, first-rate clinicians devoted to improving the care of the elderly and to fostering the growth of geriatric medicine."

To head the new Geriatrics Unit which began operation this fall, Dr. Leaf chose Dr. Edward W. Campion, an MGH specialist in arthritis with a special interest in rehabilitation and long-term care.

After graduating from Dartmouth College, magna cum laude, in 1967, Dr. Campion spent a year at Oxford University in England as a Rhodes Scholar and a year at Union Theological Seminary in New York on a Rockefeller Fellowship. He later entered Dartmouth Medical School, graduating from there with honors in 1974.

Subsequently he trained at Cambridge Hospital in Cambridge, Mass., and at the Robert Breck Brigham and Massachusetts Rehabilitation Hospitals in Boston, as well as the MGH.

He is a staff rheumatologist at the rehabilitation hospital which will figure prominently in the operation of the Geriatrics Unit.

During the past summer, as an MGH Dalton Scholar, Dr. Campion traveled extensively through England and Scotland to study geriatrics. "The whole system of geriatric care is much more developed over there than it is in our own country," he said.

The concept of classifying people at age 65 as senior citizens was initiated by the German social security system in the 19th century and, in Dr. Campion's opinion, was very arbitrary.

Photography: Pages 1, 3, 4, 5, 6 (lower left), Myron Daniels; p. 6 (upper, lower right), Mel Snyder; pp. 7, 8, MGH Photo Lab.



Dr. Edward W. Campion, Chief of the MGH's new Geriatrics Unit, looks in on a seriously ill, elderly patient on one of the Bigelow Building's medical service floors.

"People age at various rates but generally where the problems really start to multiply is in patients who have reached age 75," he said. "In fact, some British geriatrics units are focusing their entire departments just on patients over 75."

Dr. Campion intends to do the same. He pointed out that a recent check of the nonintensive care patient population on the medical service floors of the MGH's Bigelow Building showed only 35 percent of the patients were under 65, 20 percent between 65 and 75, and 45 percent over 75.

The Geriatrics Unit began operating on just one of the Bigelow medical floors in order to test the effectiveness of a newly organized consultation team.

Comprised of Dr. Campion and specialists from social service, nursing, dietary, physical therapy, occupational therapy, recreational therapy, the speech-language disorders unit, and psychiatry, the team set out to evaluate the needs of and make recommendations for every patient 75 or older. The patients continue under the direct care of their MGH medical team.

"In dealing with the most complex and difficult cases, particularly patients who are chronically ill, the physician just cannot work alone effectively," Dr. Campion explained. "The key lies in working as part of an interdisciplinary team."

Sensory deprivation among aged patients is a very real problem, he said. Consider such a patient, possibly with impaired hearing or vision, awakening in the unfamiliar surroundings of a hospital after being admitted with an acute

illness that includes a fever. Disoriented and depressed, the patient, after a few days in bed, may need rehabilitative services as much as the antibiotics.

When an elderly patient is confined to bed, complications also can accumulate very quickly in the form of pressure sores, weakening of muscular function, loss of endurance and even of the will to maintain his independence. "We want to help such people maintain or reestablish those vital functions which would allow them to care for themselves later in their own homes," Dr. Campion emphasized.

The Massachusetts Rehabilitation Hospital, situated within walking dis-

tance of the MGH, provides an ideal setting for the follow-up care needed by many elderly MGH patients, and also for the teaching of geriatrics and rehabilitation to students and health professionals. Dr. Campion divides his time between the two institutions.

In stressing the importance of geriatrics in medicine, Dr. Leaf pointed out that the reaction of older people to even common diseases often differs from that of younger individuals.

The older heart attack sufferer may not experience the same kind of pain as his younger counterpart. Older patients with various types of infections may escape a fever that would normally develop in other patients stricken with the same condition.

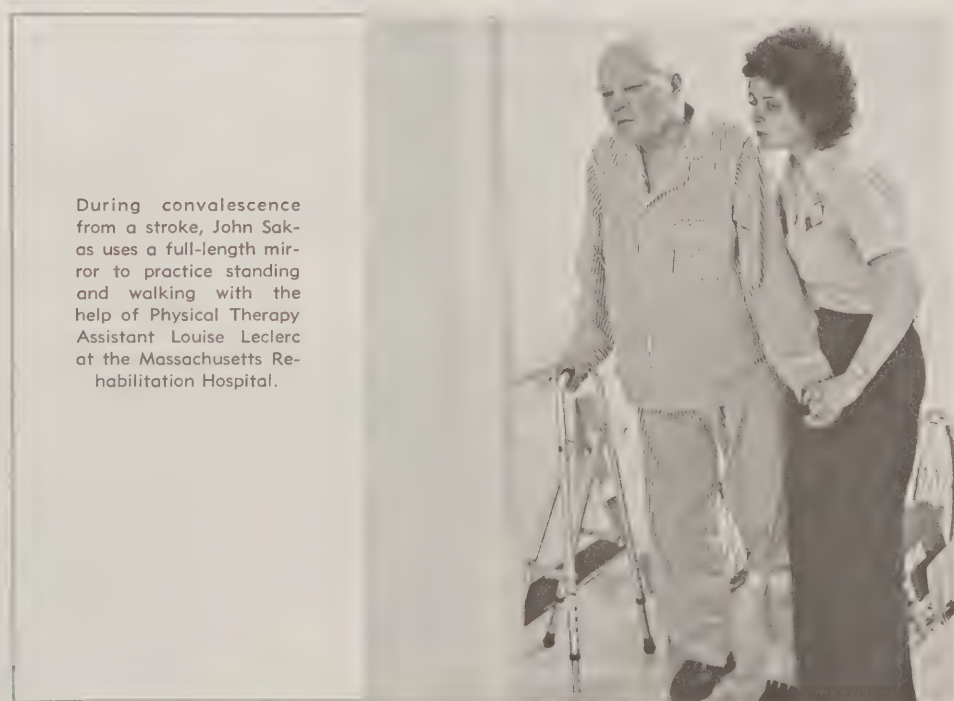
Such variable responses by an aged patient can make it difficult for a physician to make a correct diagnosis and to prescribe needed medication.

Dr. Campion, an Instructor in Medicine at Harvard Medical School, is helping the school to develop a geriatrics curriculum, such as courses on the biology of normal aging.

"Normal aging is not just so many more years on the calendar but a very real biologic phenomenon, which is still poorly understood," he said. "As people advance in years, they undergo predictable changes, such as a slow decline in renal [kidney] function, and a loss of bone mass which leads to osteoporosis" (*MGH News*, May 1978).

Some women who live into their 80s

(Concluded on Page 4)



During convalescence from a stroke, John Sakas uses a full-length mirror to practice standing and walking with the help of Physical Therapy Assistant Louise Leclerc at the Massachusetts Rehabilitation Hospital.



An infant patient at the MGH sleeps soundly in the arms of a foster grandmother, Mrs. Frances Dentch.

Foster Grandparents Offer Children Extra Measure of Affection

For seriously ill children at the MGH, treatment requires more than the best medical care.

Often far from home and parents, and facing an extended hospitalization, a child also needs constant love and emotional stimulation.

In a program unique in a Massachusetts hospital, a team of foster grandparents is filling such needs in the MGH Children's Service.

Through consistent daily activities such as holding or cuddling, feeding, dressing, or playing with a young patient, the foster grandparents furnish a service as vital to the growth and development of the child as medical attention itself.

MGH Community Programs Aid Elderly

(Concluded from Page 3)

and 90s almost outlive their skeletons. Their bone mass, or bone strength, falls so low that even a minor fall can leave a broken hip.

Dr. Campion said his unit is working with Dr. Henry J. Mankin, Chief of the MGH Orthopaedic Service, to establish a fracture registry. It will provide valuable information on how well elderly people can recover from hip fractures. Since such breaks are often complicated by other disorders, a large number of these patients become rehabilitation challenges.

Special attention to the problems of the elderly is not new at the MGH. Since 1976, the MGH-Chelsea Health Center has cared for more than 300 elderly people confined to their homes by chronic ailments.

Under the direction of Dr. Fred H. Rubin, the home care program arranges medical, nursing, rehabilitative, and social services for the aged members residing in Chelsea and neighboring Revere and Winthrop.

At each of two large housing projects for the elderly in Chelsea, a unit has been converted into a medical office. Once a week, either Dr. Rubin or a nurse practitioner visits the unit, or "outreach clinic," to assist residents who need medical help.

A case coordinator, Mrs. Lorraine Capistran, maintains close communi-

cation with the elderly, helping them to apply for services such as Meals on Wheels or for other benefits to which they are entitled (MGH News, February 1977).

At the MGH-Bunker Hill Health Center in Charlestown, a geriatric team has been awarded a one-year grant by the City of Boston to hire and train home health care workers. Their job will be to assure supportive services in the community for older patients who otherwise might face institutionalization.

For the past year, a group of volunteers, mainly retired nurses and social workers, has provided similar services

for the terminally ill of Chelsea and Charlestown under a program directed by Dr. Andrew Billings of the Chelsea Health Center. Although these patients may occasionally need hospitalization, they are able to live at home most of the time.

The MGH, through its Social Service Department also arranges foster home care for elderly or frail patients who otherwise would face transfer from the hospital to costly, overcrowded nursing homes. Proposed by Miss Eleanor Clark, Director of Social Service, the program reduces patient dependence on institutions while assuring continuation of needed care at less expense. ■

In a perceptual evaluation test, stroke patient Herbert Egersheim lines up matchsticks according to a diagram held by Occupational Therapist Marla Blau-stein at the Massachusetts Rehabilitation Hospital.



"Staff nurses are very much tuned in to the nonmedical needs of their patients," said Dr. David Todres, Director of the MGH Pediatric Intensive Care Unit, "and we've always encouraged holding the little ones, for example. But although nurses assume responsibility for the care of a number of children, some do require extra hours of attention.

"A child's growth and development are ongoing and must be nurtured constantly. Thanks to the voluntary foster grandparents' program, we are providing that necessary stimulus even as we treat the child's physical ills."

Although parents are encouraged to join in the care of their hospitalized children, studies have shown that on the sixth floor of the MGH's Burnham Building, where the children's Intensive and Intermediate Care Units are situated, 14 percent of the inpatients are from families living more than a three-hour drive from the hospital.

In addition to finding distance a barrier to frequent visits, parents often are unable to leave other children in the family or to take repeated time off from jobs.

Several years ago, Miss Anne H. Sheetz, RN, Chairman of the Pediatric Nursing Service, sought to institute a foster parent aide program after the experimental assignment of a full-time volunteer to a single patient led to considerable progress in the child's development and recovery. However, finding parents who could volunteer sufficient time to make their efforts really effective proved extremely difficult.

A little more than a year ago, Mrs. Maeve Blackman, Director of the MGH Volunteer Department, learned of the availability of five senior citizens. Their service as foster grandparents at the Walter E. Fernald State School in Waltham was being ended.

Under a policy adopted by the Massachusetts Department of Education, children in state schools who could benefit from public school training had to be moved into a community setting. Many grandparents followed the children into public education systems as tutors.

The five foster grandparents who accepted an invitation to serve at the MGH began their pioneering work last January. Ranging in age from 67 to 74, they were Carlos Gooden and Mrs. Dorothy Trottier, both of Boston's Dorchester section; Mrs. Frances

While Mrs. Catherine Baptist's artwork may win no prizes, it still holds the attention of this young patient.



Dentch, of Back Bay; Mrs. Catherine Baptist, of Cambridge; and Mrs. Myra Luzinski, of Lynn.

Arrangements made with Project Foster Grandparent, conducted by Concerned Boston Citizens for Elder Affairs, Inc., provided for a four-hour-a-day, five-day week at the MGH. Funds available from ACTION, the federal social service agency, permitted a nominal stipend to members of the team to cover personal expenses.

"Although many of their skills were transferable, the change was not easy for them," said Ms. Edith Stein, Director of Project Foster Grandparent. She explained that some of the grandparents had worked with the same child at Fernald for a number of years, and in their new position their relationship with a child might be very temporary. Once a youngster was sent home from the MGH, they would have to

get used to another.

"You develop a very close relationship with the children," said Mrs. Luzinski, who is not only a grandmother but also a great-grandmother. "It took about a month for me to become acclimated to this new setting, but I love it now. And the parents really appreciate our efforts. Their simple, sincere 'Thank you' means an awful lot."

Although assigned to one child, with parental consent, each foster grandparent is free to interact informally with other patients while their charge is asleep or undergoing surgery or tests.

"The reaction of the staff nurses to the foster grandparents has been very positive," said Miss Sheetz. "The consistency of their attention to our infants is of supreme importance since the babies are in such a rapidly developing phase."

Mr. Gooden, now on sick leave, was particularly helpful with older children who sometimes felt depressed and alienated. He befriended them, earned their trust and respect, and before long they were freely discussing their problems with him.

In addition to Mrs. Blackman and Miss Sheetz, the grandparents work closely with Miss Elizabeth Hogan, RN, Miss Carolyn Wortman, RN, and Mrs. Patricia Ruggiero, RN, all staff nurse leaders; Miss Evelyn Corsini, of Social Service; Miss Sally Cave, Children's Service Recreational Therapist; and Paul Engelberg, Coordinator of Project Foster Grandparent.

Miss Sheetz commented:

"As the months pass, it's delightful to see the grandparents feeling more and more that they're part of the MGH staff." ■



Mrs. Dorothy Trottier keeps a youngster occupied in a pediatric unit playroom.



Patient undergoes cardiac stress test on treadmill while Dr. Timothy E. Guiney takes repeated blood pressure readings and a technician closely monitors electrocardiograph.

weighed too much, had high blood pressure and a family history of heart disease.

An EKG initially indicated some minor changes in heart activity, but later when the patient underwent an exercise stress test in conjunction with another EKG examination, his heart rate rose to 180 beats per minute—about as fast as a normal heart can be pushed—and he experienced no pain. The EKG results were normal, as was a thallium scan.

The patient did not require angiography because, as Dr. DeSanctis put it, “in view of his performance in the tests already conducted, the chances of his having any significant blockages in his blood vessels were virtually nil.”

The doctor added, however, that considering the risk factors that were present, the scare the patient had could turn out to be a blessing in disguise, because it might motivate him to change his life-style.

Dr. DeSanctis, who is also Professor of Medicine at Harvard Medical School, emphasized that many diseases of the heart, including arteriosclerosis, produce no abnormal sounds that the doctor can detect with a stethoscope.

When pain is present, therefore, a carefully obtained medical history of the patient is the single most important information in making the diagnosis. Since pain cannot be seen but only felt, the physician must learn from the patient the kind of pain it is, where it is situated, what brings it on, what makes it go away, and how long it lasts.

The stethoscope does help the physician to detect heart valve deformities based on some inflammatory or degen-

Chest Pains Often Call for Heart Exam

(Continued from Page 1)

by constant EKG monitoring during exertion, and gradually he has managed to increase his exercise tolerance, as well as lose excess weight. His physicians are pleased with his progress.

“One can have very severe blockages in critical areas of the heart and not have any symptoms at all,” said Dr. Roman W. DeSanctis, an MGH cardiologist and Director of the hospital’s Phillips House Coronary Care Unit.

He said the chest discomfort mentioned originally by the patient sounded like pain coming from the heart (angina pectoris), a warning of possible coronary arteriosclerosis, or hard-

ening of the arteries of the heart.

The pain of angina arises most often as a heavy sensation in the center of the chest, sometimes radiating into the neck or left arm, and results from the heart’s inability to get enough blood during a period of increased need, such as during exercise or emotional excitement. The pain usually goes away after only a few minutes if the patient suspends the activity causing the distress.

While chest pains often signal a need for medical attention, they do not necessarily reflect a heart problem. Dr. DeSanctis told of a 43-year-old banker who suffered chest discomfort while under extreme tension.

The banker smoked more than two packages of cigarettes a day. He



After being injected with a radioactive solution containing the isotope thallium-201, patient awaits use of a nuclear medicine camera sensitive to the thallium to produce an image of his heart. At right, image of another patient’s heart shows dark areas at top and bottom (arrow) indicating damaged tissue which could not take up the thallium.

When a Doctor Needs a Doctor

The MGH has earned high marks in a nationwide test to learn whom doctors would pick as their own physicians.

In research for a new book, *The Best Doctors in the U.S.*, published by Seaview Books, health writer John Pekkanen of Washington asked 545 members of the medical profession:

"If you or a member of your family were ill with a problem in your own specialty, who [sic] would you go to for treatment?"

After checking the initial nominations with other specialists, Mr. Pekkanen had a list equal to one-half of one percent of the nation's doctors. About one physician was chosen for every three hospitals in the United States.

Of the individuals named, 38 were staff members of the MGH, including one assigned to a psychiatric division, McLean Hospital in Belmont, Mass.

Two of the 38 were each listed as among the best in two different areas of subspecialization.

More than 1 in 4 (26.4 percent) of the 144 Massachusetts doctors named were from the MGH.

Six physicians on the staff of the MGH-affiliated Massachusetts Eye and Ear Infirmary also earned accolades, as did the entire MGH Burn Unit and another affiliate of the hospital, the Shriners' Burns Institute.

Across-the-board quality and strength were the major criteria in a survey leading to a choice of 16 general hospitals in America as outstanding. In addition to the MGH, described as the major teaching hospital in the Harvard University system, Mr. Pekkanen's book lists Boston's Peter Bent Brigham and Beth Israel Hospitals, both also Harvard-affiliated.

The author made a further comment on teaching institutions in an article, *The Best Doctors in Washington*, appearing in the October issue of *The Washingtonian*. Referring to his nationwide survey, he wrote:

"Every doctor interviewed on the subject said a university-affiliated medical center was much to be preferred to nonaffiliated hospitals; thus, a university-affiliated hospital is the hub of its city's medical profession.

"Boston, for example, has long been considered one of the top cities for medical care. The reputation is well founded, and the main reason for it is Harvard.

"Massachusetts General Hospital is largely staffed by the Harvard faculty and has been considered one of the country's best, if not the very best, general hospital."

erative process such as that resulting from rheumatic fever and certain birth defects of the heart.

Such abnormalities of the heart are associated with typical murmurs (swishing sounds, like water flowing through a pipe). On the basis of the particular sound alone, the doctor can often identify the specific valve that has been damaged.

Not all murmurs indicate disease, however. In fact, Dr. DeSanctis pointed out that "if you listen hard enough, you will find a soft murmur in practically every child." This is called an "innocent" or "functional" murmur and is an exaggeration of the sounds normally made by blood moving through the heart. The irregularity usually disappears by adulthood.

Echocardiography, a form of ultrasound, has proved helpful to doctors in their study of the heart's structure, and particularly in discovering abnormalities involving the mitral valve. Echoes from beams of ultrahigh frequency sound waves directed through the chest wall provide the data.

The mitral valve controls the flow of blood, newly supplied with oxygen, in passing from the heart's upper left chamber (atrium) into the lower left chamber (ventricle). The blood then moves through another valve (aortic) and into the body's main artery.

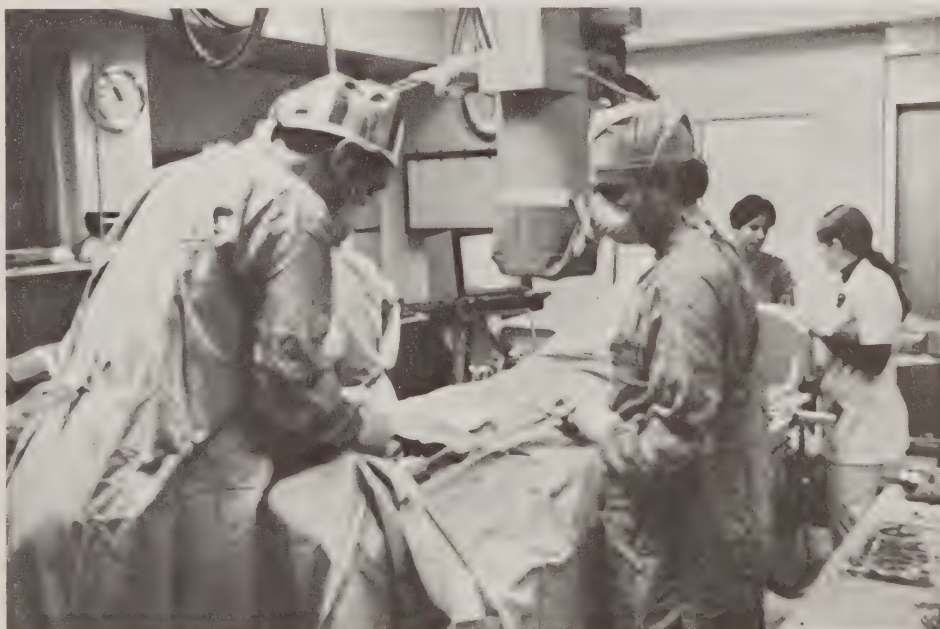
In assessing heart disease, a physician might pass a small tube through a vein in an arm, a leg, or the neck and into the heart. By this process, called cardiac catheterization, the doctor can obtain blood samples, measure pressures, and inject dye to outline the chambers and arteries of the heart.

Angiography, a form of catheterization, provides a very accurate assessment of blood vessels within the heart,

but because of some risk to the patient, as well as a certain amount of discomfort, doctors limit their use of this procedure. Noninvasive tests often provide sufficient information to make a proper diagnosis.

For an individual whose heart disease has already been diagnosed, some medical centers like the MGH now

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Dr. Peter C. Block, left, Director of the MGH Cardiac Catheterization Laboratory, prepares patient for angiography, a special X-ray procedure that shows the condition of blood vessels. Dr. John McDermott assists.

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New Heart Test Judges Surgical Need

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offer a test which determines how well the patient is tolerating his condition. Does his heart have sufficient reserve capacity to continue to pump acceptably, or does he need immediate corrective surgery?

Called a "gated stress test," the procedure represents a collaboration of the hospital's Nuclear Medicine Department, under Dr. H. William Strauss, and Drs. Gerald M. Pohost and Charles A. Boucher of the MGH Cardiac Unit.

The test employs the same camera used for the thallium scans, but a different radioactive material (technetium) is injected into the patient. Emissions from the substance detected by the camera later enable a computer to compose a display of the beating heart showing its condition in motion picture

format.

The test is taken by the patient while at rest and then during exercise on a stationary bicycle.

When a heart attack strikes an individual, the symptoms usually involve an oppressive, unrelenting pain in the middle of the chest, and often include a sensation of nausea, frequently profuse sweating, and sometimes a feeling of shortness of breath.

The attack denotes damage to a portion of heart muscle because of lack of normal blood flow to that segment.

Hardening of the coronary arteries is customarily blamed for obstruction of the blood supply, but in recent years studies have indicated that severe spasms, a temporary squeezing off of an artery, can precipitate a heart attack.

Dr. Peter M. Yurchak, an MGH

cardiologist and Director of the hospital's "Baker-6" Intensive Care Unit, said, however, that attacks caused by prolonged spasms are very rare when compared with those brought on by arteriosclerosis.

Why spasms occur in some people and not in others remains to be explained, he added.

Although the incidence of heart disease in the United States has been declining, nearly one million Americans are still struck down by attacks each year, and more than 600,000 die.

Dr. Yurchak stressed the importance of quick transportation of a heart attack patient to a hospital. The person's heart rhythm can be monitored there and supported with medication, if necessary, to avoid the danger of the heart stopping (cardiac arrest). Potent pain relievers, such as morphine can also be administered, as well as oxygen.

While an EKG keeps hospital personnel alert to any changes in the patient's condition, a "blood enzyme" test is performed to provide an indication of the extent of damage.

Dr. Yurchak, an Associate Clinical Professor of Medicine at Harvard Medical School, explained that dying heart muscle cells release into the blood large quantities of enzymes normally found in only small amounts in the blood. The degree of rise offers clues to the severity of the attack.

In recent years the trend has been to release patients with uncomplicated heart attacks after shorter hospital stays (*MGH News*, November 1976).

Nowadays the MGH usually discharges the patient after 10 or 12 days. By then he is back on his feet if no complications have arisen. A four-to-six week convalescence at home follows. If the patient's job is not physically strenuous, he can then return to work, preferably on a halftime basis for a week or two before resuming a full schedule. ■



With a young volunteer assisting, EKG Technician Diane Carleton demonstrates how the heart's electrical activity can be recorded. By telephoning her laboratory, Mrs. Carleton also sets in motion a duplicate printout for permanent filing.



MGH News

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March, 1980

Logan Airport Medical Station Meets Many Needs

The Dangers of Misusing Medicine

While en route to an appointment, a middle-aged salesman suddenly felt pain building in his chest. Without alarm, he halted his car by the side of the road, reached into his pocket for a pillbox, and placed a small tablet under his tongue to dissolve.

In the past, the drug (nitroglycerin) provided relief within a minute from the pain of angina pectoris, a condition related to insufficient blood reaching the heart muscle, but this time the discomfort persisted.

As his concern mounted, the salesman quickly forgot about his business meeting and hurried to the nearest hospital for emergency care.

"Nitroglycerin is very effective in treating angina pectoris," said Dr. John D. Goodson, an MGH internist, "but the pills the salesman had in his possession were so old they had lost their effectiveness."

Dr. Goodson explained that nitroglycerin is a relatively unstable compound which should not be used after six months or so. "The drug is inexpensive, so there's no reason why an outdated supply cannot be replaced," he said.

"But the patient's physician must first make the individual aware that his medicine has a brief shelf life. In addition to making this point clear in his office, the physician can instruct the patient's pharmacist to print a reminder on the prescription label."

In some instances, pharmacists do not list expiration dates of drugs because they know their material is fresh and will normally be consumed fairly

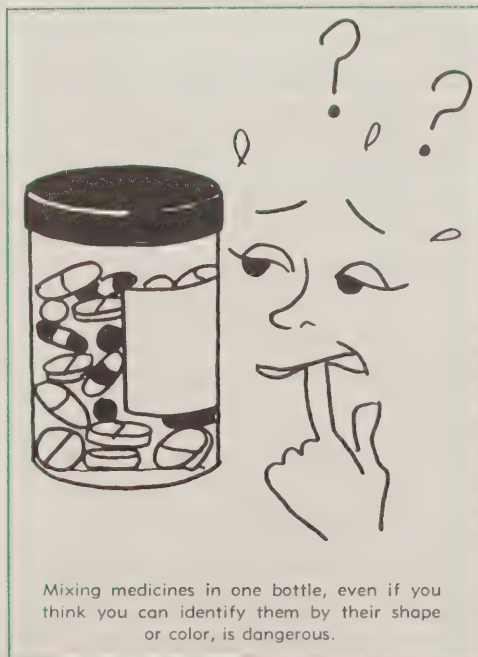
quickly. But certain drugs, such as nitroglycerin, might lie around for some time before occasions for their use arise.

"For medical care to be effective, particularly when it comes to taking medicines, the physician and the patient must work together," Dr. Goodson emphasized. "Both have responsibilities.

"When the physician prescribes a drug, he must make sure that the patient knows the name of the medication, what it is expected to do, how to take it, and what side effects it might cause, as well as how long it will remain potent.

"As for the patient, he or she must follow the doctor's directions. If the drug fails to do its job or produces any

(Continued on Page 2)



Mixing medicines in one bottle, even if you think you can identify them by their shape or color, is dangerous.

Tired after a full day's work, Maureen Barnes was anxious to get home as she drove by the exit signs pointing the way out of Boston's Logan International Airport.

Suddenly, she heard sirens and noticed smoke pouring from an airport catering building.

As if by reflex, Maureen changed course. Within minutes, she was treating a number of injured at the fire scene.

"She just dove in," recalled State Police Captain William McCabe, Commanding Officer of Troop F at Logan. "The nurse's uniform that Maureen wore at the Airport Medical Station quickly turned from white to a sooty gray, but she paid no attention to that."

Meantime, other members of the station staff who had just closed the MGH-operated facility hurriedly reopened its doors. Soon, they were caring for more of the injured.

"We're a city within a city," said Captain McCabe, describing the country's tenth busiest airport, "and it's always comforting to know that in the event of an emergency, medical personnel are only minutes away."

In addition to having a work force of 12,000, Logan Airport accommodates an estimated 37,000 air passengers daily. And then there are the "meeters, greeters, and well-wishers." They number conservatively twice the passenger toll.

During hours when the MGH-Logan Airport Medical Station is closed, personnel at the nearby East Boston Health Center stand ready to respond to any emergency calls from the airport.

Dating to January 1963 the medical

(Continued on Page 4)



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EDITORIAL:

A Plea for Better Drug Labeling

The Food and Drug Administration (F.D.A.) is planning to require drug companies to insert warning leaflets into most prescription drug packages. Described will be potential adverse side effects of the particular medication being sold. Obviously the F.D.A. hopes by these cautions to reduce the risk of side effects. In doing this the federal agency is following the precept that an informed consumer is a wiser consumer.

Not everyone agrees. Some argue that the warnings will frighten patients into not taking vital medications. Others predict that the government requirements will prove expensive. As a result of these concerns, the F.D.A. has slowed its timetable. At first, inserts will accompany merely 10 drugs. Only if the benefits seem to overshadow the drawbacks would the agency carry out its ultimate plan of inserting leaflets into about 375 prescription drug packages. This cautious approach makes much more sense than a precipitous start.

In addition we would suggest consideration of a further requirement. The inserts may prove a helpful innovation for some. There is, however, vital information that the inserts will not contain: the purpose for which the physician prescribed the drug, precise information about when the medication should be taken, and the date when the drug deteriorates. These are all potentially crucial facts. Typed by the pharmacist on the label might be: "Liquid penicillin for strep throat. Take one teaspoonful 3 times a day, 1 hour before each meal. Discard after 10 days." To achieve this labeling would require an extra minute on the part of the prescribing physician and the pharmacist. One should not minimize the importance to the busy professional of that extra minute per patient receiving drugs. On the other hand one cannot overstress the advantages that may accrue to the patient. As a page-1 article in this issue points out, this kind of information can prove lifesaving.

Already three governmental bodies are proposing a plan to require improved labeling on food products. How much more critical is it to mandate more instructive labeling of powerful drugs.

Drug Interaction Can Be Harmful

(Continued from Page 1)

unexpected reactions, the patient must notify the physician immediately so that he can adjust the prescription or change to something else."

Frequently when doctors are consulted for the first time by patients taking drugs prescribed elsewhere, the patients cannot identify the medicine. "It's a red pill for my ulcers," they might say, or "a green pill for my heart."

"My message to new patients is to bring to their appointment their entire supply of whatever remedies have been prescribed for them in the past," said Dr. Goodson, who is also an Instructor in Medicine at Harvard Medical School.

"By 'sweeping out the medicine cabinets,' the patients enable me to determine which medications they're currently taking or have taken. Sometimes they'll bring along other drugs that are so old they've either lost their potency or become a hazard."

The more health professionals analyze medicines the more they realize how one drug can often heighten or counteract the effects of another.

Medical investigators, for instance, have discovered the danger that can result when two common heart drugs are used simultaneously.

As an example, a doctor prescribes digitalis for a patient with congestive heart failure, resulting from the heart's inability to pump properly. After progressing satisfactorily, the patient develops an irregular heartbeat (arrhythmia) and calls on a different physician. The latter, not told of the digitalis,



If your medicine is causing a side effect, notify your physician. Never omit the medication without the doctor's permission.



Make sure that you understand the instructions given for your medicine. If in doubt, do not hesitate to ask your doctor or nurse for clarification.

prescribes quinidine to regulate the heart action. The result: the interaction of the drugs leads to higher blood levels of digitalis even though the dosage for that medicine has not been altered.

The toxic effects of digitalis include loss of appetite (anorexia), nausea, diarrhea, mental depression, blurred vision, and even complete heart block, a lack of coordination in the beating of the heart's chambers.

Another example: A patient given Coumadin (an agent which prevents the clotting of blood) as a precaution against the recurrence of a floating blood clot (embolus) suddenly develops a urinary tract infection. A doctor, unaware that the patient is on Coumadin, prescribes an antibiotic, ampicillin. The latter intensifies the activity of Coumadin, raising the risk of severe bleeding.

The unwanted action need not be triggered by a prescription drug. Common aspirin, bought over the counter, acts against platelets, a component of the blood-clotting system. Thus, a person on Coumadin who takes aspirin for a headache would find himself in a perilous situation in the event of any accident which precipitates bleeding.

Because Coumadin interacts with many different medications, posing a threat of adverse side effects, an MGH

cardiologist, Dr. Peter M. Yurchak, established an Anticoagulant Therapy Clinic in the hospital. Patients requiring treatment to prevent blood clots are carefully monitored by the clinic to maintain effective but safe levels of drug activity. The clinic marked its 10th birthday last month.

Antacids taken simultaneously with certain antibiotics such as tetracycline provide a good indication of how one remedy can neutralize another.

If a patient decided on his own to take antacids for an ulcer while his physician was treating him with tetracycline for a urinary tract problem, the doctor probably would discover the following week that symptoms of the latter difficulty were still present.

A common problem doctors find is that patients often stop taking their medicine as soon as they feel better. This can be a dangerous practice because lasting improvement frequently depends upon continuation of the drug treatment.

Correspondingly, some people believe that when they have used up all the pills prescribed for an ailment, they can consider themselves cured. The condition might be a chronic one requiring

chronic treatment. In such a case, physicians usually will prescribe enough pills to overlap the next appointment.

Some patients have difficulty understanding what is printed on prescription labels. A federally financed study conducted a few years ago indicated that one adult American in every five was "functionally illiterate."

In addition to listing the name of the drug on the label, Dr. Goodson believes the pharmacist should also specify what the medicine is for, i.e. "Aldomet for high blood pressure."

Also, the doctor said, to simply instruct, "One pill three times a day," can be too general. The patient might take a day's supply within a few hours.

A more precise statement would be, "Take one pill at mealtime three times a day," or "Take one pill at 8 a.m., 1 p.m., and 6 p.m."

When a pill is taken can be very important. While many tablets, including most of those given on a chronic basis, can be consumed at mealtime, others, such as most antibiotics, are best absorbed by the body when swallowed between meals.

In general, a liquid dosage prescribed for an adult represents an estimate of the most desirable amount. For children, however, the dosage must be more precise since the physician must take into account the size of the child.

A patient who forgets to take his medicine on schedule may figure, "Well, I'll make it up by taking a double dose next time." This can lead to drug poisoning and a host of new problems. The patient should simply resume his routine with the usual dose.

Of all the precautions laid down in the taking of drugs, the bottom line should be a reminder that no drug is without side effects if misused. ■

Outdated medicines and those which have been discontinued by the doctor should be thrown away.



Drawings: Pages 1, 2, 3, Ann Mahoney, RN.

Photographs: Page 4 (upper), courtesy of Airport Journal; pp. 4 (lower), 5, 6 (lower left), Myron Daniels; p. 6 (lower right), courtesy of William P. Corbett; p. 7, courtesy of Dr. John A. Parrish; p. 8, courtesy of Dr. John P. Remensnyder.



Dr. Kenneth T. Bird, then Director of the MGH-Logan Airport Medical Station, relays instructions over portable radio during disaster training exercise.

Guarding the Health of Air Travelers

(Continued from Page 1)

station represents the oldest existing MGH extension of patient care into the community from the hospital's central campus in the heart of Boston.

"We believe the station is still the only one of its type in the country to be directly connected with a major teaching hospital," said Dr. John W. Keller, Director of the unit.

An MGH internist and graduate of Harvard College and Harvard Medical School, Dr. Keller took over the helm of the station last September from Dr. Kenneth T. Bird, a fellow Harvard alumnus who returned to the MGH campus after having directed the satellite operation since its inception.

"The MGH station is a combination of things," Dr. Keller remarked. "At times, we provide an emergency ward type of service. At other times, we treat people seeking relief from chronic aches and pains.

"We also administer flight certification physicals, administer vaccinations to individuals flying overseas, give advice by radio for the care of ailing airborne travelers, and serve as caretakers for sick airline passengers who may have to change planes at Logan. The wait between flights can be as long as three hours."

An important role is the one borne by the station personnel in the event of a plane crash. It was an airliner crash in the bay off Logan in 1962 that led

the Massachusetts Port Authority, operator of the airport, to ask the MGH to extend its care to Logan.

Members of the MGH Logan staff would be the first medical personnel to reach the scene of any disaster at the airport. Situated in the airport's administration building, a floor above the headquarters of Logan's State Police unit, the doctors and nurses are assured of immediate police transportation.

Triage (determining medical care priorities) and treatment constitute the principal responsibilities of the team. Working from a command post, Dr. Keller would have initial charge of the



Dr. John W. Keller, appointed recently to head the airport medical station, chats with a patient.

medical operation, including arrangements to rush victims to Boston area hospitals.

Twice a year, the airport conducts full-scale disaster drills, one of them at night.

During its first five years of operation, the medical station served about 1,000 patients annually. Today, the station sees 1,000 patients monthly.

Dr. Keller works full-time at the unit, assisted part-time by Drs. Edwin L. Carter, Niranjankumar Dudani, and Orrin Levin.

Marie E. Kerrigan, RN, supervises the clinic's team of MGH staff nurses, including Mrs. Barnes, Carole Nania, Jo Birdsey, June Carroll, Betty Angel, and Marjorie Jastrzebski.

Frequently, the MGH School of Nursing assigns students to brief work stints at the clinic to experience the types of services performed there.

"Although basically we are a walk-in clinic, we pay attention to more than just the patient's immediate chief complaint," said Dr. Keller. "We look for any underlying problems that may be present, and we don't hesitate to refer the patient to specialists at the MGH if their assistance is needed."

Not long ago, a man walked into the medical station complaining of chest pains. Tests of his heart proved normal, but continued examination disclosed a more than three-inch-long swelling (aneurysm) on his main artery (aorta). Surgery at the MGH corrected the often fatal condition.

Every two weeks or so, Dr. Keller's staff provides interim care for ill travelers waiting for a change of flights at the airport. One such patient recently was a four-year-old boy who suffered brain injuries in an automobile accident in Saudi Arabia.

Comatose for two months, the boy was flown from Riyadh to London and thence to Boston, accompanied by a physician and a nurse. Their ultimate destination was a hospital in California where a neurosurgeon awaited an opportunity to study the youngster and devise treatment.

During a two-hour layover at Logan, the accident victim received oxygen at the medical station. Nurses also kept his lungs clear of possible congestion and maintained a constant check of his pulse, breathing, and temperature.

The importance of the medical station's vaccination role is exemplified by the fact that the clinic gives about 6,500

Control of Legionnaires' Disease Mounts

Four summers ago, an outbreak of a mysterious, respiratory disease stunned residents of Pennsylvania.

Throughout the state, 181 persons were stricken. Twenty-nine died.

Although perplexed by the malady, health officials quickly uncovered one common thread running through the most recent activities of the patients. All had either been in or near the lobby of Philadelphia's Bellevue Stratford Hotel.

Most of the patients had just attended an American Legion state convention at the hotel. Others had made transient visits, such as one individual who stopped by to purchase an airline ticket and another who merely used the men's room.

Other people contracted the illness after walking by the hotel entrance on Broad Street. They never even went in.

Ironically, except for an air conditioning repair man, no hotel employees became ill. Constant, low-grade exposure to whatever was causing the sick-

ness may have given them an immunity.

Six months passed before scientists at the federal Center for Disease Control (C.D.C.) in Atlanta, Ga., isolated the elusive bacterium responsible for the malady. By then, the name of Legionnaires' disease had caught on.

Investigators think the bacteria may have bred in soil and been carried by winds into the hotel's air conditioning system, but at this time the theory remains just that.

Speaking recently at an MGH Medical Grand Rounds, Dr. Morton N. Swartz, Chief of the hospital's Infectious Disease Unit, said Legionnaires' disease probably accounted in the past for as many as 25,000 unlabeled cases of pneumonia in the United States each year.

Dr. Swartz was one of five specialists chosen by the C.D.C. to advise on the search for the cause of Legionnaires' disease.

As a consequence of efforts by the Center itself, teaching hospitals, he said,

can now provide both a rapid diagnosis of the disease and effective treatment.

The bacterium referred to technically as *Legionella pneumophila*, grows very slowly in the laboratory, even with special substances (media) to aid the cultivation.

Originally, the diagnosis of the disease involved comparing two samples of blood serum, one obtained from the patient at the start of his illness and the second collected four or five weeks later. If the patient had contracted the disease, the second blood sample would show a high level of antibodies, substances produced by the patient's own immune system, to fight off the invaders.

Today, specialists can make the diagnosis in a single day, thanks to the Direct Fluorescent Antibody test.

The C.D.C. supplies laboratories with an antiserum containing antibodies from rabbits infected with the Legionnaires' disease bacteria. A fluorescent chemical (fluorescein) is attached to the antibody.

When the antiserum is combined with lung tissue or pleural fluid (which

(Continued on Page 6)

shots each year.

The United States Public Health Service has designated the MGH airport facility as a smallpox and yellow fever immunization center. Although smallpox cases are no longer known to occur in the world, at least 30 countries still require inoculation against the disease.

Special precautions must precede shots for either smallpox or yellow fever. If a person has been undergoing X-ray or drug treatment, is suffering from any tumors or blood diseases, or is pregnant, the vaccinations can create complications.

The station also administers vaccines to protect overseas travelers against cholera, malaria, tetanus, typhoid, plague, and typhus.

A major innovation for the medical station came in May 1968, when Dr. Bird initiated the first center for the practice of medicine via two-way television. The link joined the medical station and the MGH. When a doctor was not on duty at the station and a nurse there had to consult with a physician at the hospital, the special closed-circuit hookup permitted two-way visual and audio contact (*MGH News*, July-August 1968).

The doctor at the MGH could examine the Logan patient, listen to his

heartbeat with an electronic stethoscope, view on a screen a sample of the patient's blood magnified 1,000 times, and even write a prescription that appeared simultaneously at the medical station.

The federally supported trial project terminated after proving the value of the system, and it continues to be used at the MGH and at other centers.

Dr. Keller hopes that an X-ray room will soon be established at the station. The equipment is ready at the MGH, awaiting construction of specially shielded quarters at the clinic.

Meantime, Dr. Keller is enjoying his new MGH assignment because the airport brings back memories of former days as a pilot.

During World War II, he served four years with the Royal Canadian Air Force, flying Spitfires and Hurricanes. He made his first solo flight, however, in a ski-equipped Piper Cub over Logan 40 years ago.

"There was no radio equipment on board," he recalled. "You just looked at the tower, and if you saw a green light, you could land on the snow. If the light was red, you stayed up." ■

Marie Kerrigan, RN, assigned to the airport medical station since 1964, directs a team of seven MGH staff nurses.



New Illness Follows Legionnaires' Probe

(Continued from Page 5)

circulates outside the lungs), the antibodies (with the attached fluorescein) stick to any Legionnaires' bacteria that may be present. A laboratory technologist can then spot the bacteria by using a special microscope equipped with fluorescent light.

To guard against the possibility of false positives or false negatives, the technologist will still conduct the blood comparison test, but, in the meantime, treatment can be well under way. The earlier start can often prove lifesaving.

Since many types of bacterial pneumonia are treatable with penicillin, that antibiotic often would be the drug of first choice, but penicillin turned out to have no beneficial effect on patients with Legionnaires' disease. During the Pennsylvania outbreak, lack of experience with the bacterium prompted physicians to try various antibiotics. Erythromycin proved the most successful.

"Many patients will respond in 24 or 48 hours when given oral erythromycin in a dosage of two grams a day," Dr. Swartz told the MGH assembly. "Other patients may need twice the dosage, and it may have to be given intravenously."

He cautioned that even though a patient on erythromycin may demonstrate striking improvement in the course of a week, discontinuance of the drug at that time can lead to a relapse. The generally accepted recom-

mendation, he said, calls for continuing the medication for about three weeks.

Doctors who initially treated the disease in the summer of 1976 quickly realized that they were contending with a unique agent when secondary cases failed to occur. Before symptoms of their illness appeared, most of the patients had returned to their homes and mingled with their families. Yet, none of the relatives became sick.

For the first day or two, signs of the disease are indistinguishable from those of early influenza: fatigue, head and muscle aches, chills, and some fever. But soon the patient's temperature rises, accompanied by recurrent chills and development of some lung congestion. X rays indicate a patchy bronchopneumonia.

Abdominal and chest pains, diarrhea, and vomiting sometimes occur. Some patients have exhibited abnormal liver function, kidney irregularities, and a slowed heart rate, but none are specific indications of Legionnaires' disease.

The government's multimillion dollar, three-and-a-half-year investigation has brought to light other outbreaks of the disease, some preceding the Legion episode, and has provided additional clues to the illness.

Of the patients stricken thus far, one third were individuals with suppressed bodily defenses due to medications connected with transplantation surgery or cancer, or the treatment of some disease

(autoimmune) in which the body acts against itself.

Although Legionnaires' disease has befallen people of virtually all ages, middle-aged men seem particularly susceptible, as well as smokers. The illness strikes mainly in the summer and has an incubation period of between 2 and 10 days.

Dr. Swartz, who is also Professor of Medicine at Harvard Medical School, said the disease has now been reported in almost every state in the union, as well as throughout Europe and in the Middle East.

Meantime, another previously unknown bacterium has been discovered, coincidentally in Pennsylvania. Called the Pittsburgh Pneumonia Agent, it was tracked down by means of the same techniques used to identify Legionnaires' disease.

The Pittsburgh Pneumonia, however, apparently affects only patients taking high doses of immunity-suppressing drugs.

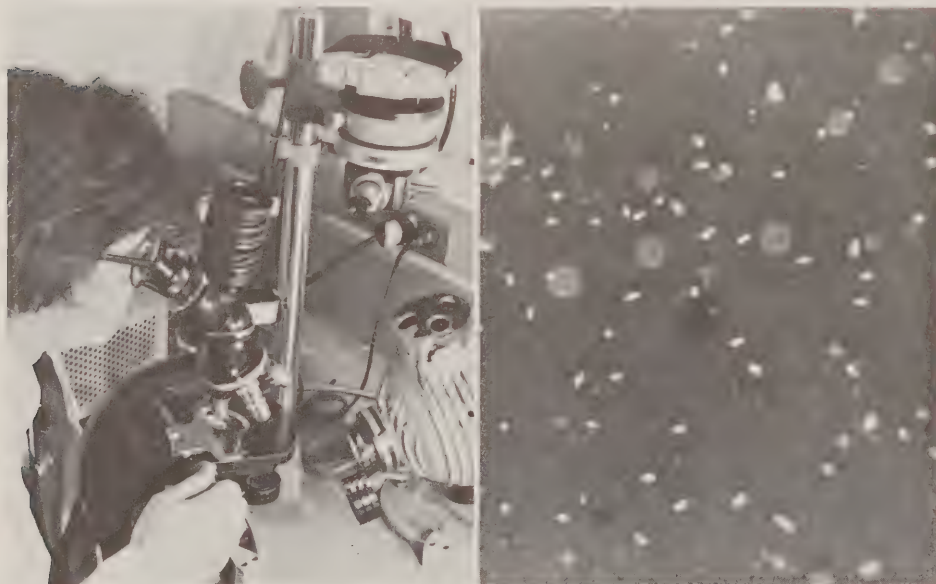
Like its Legionnaires' counterpart, the Pittsburgh organism will not grow in customary laboratory media or respond to the most commonly used antibiotics, such as penicillin.

The new disease has turned up thus far in Virginia as well as in Pennsylvania, but because the illness appears to confine itself to a relatively small segment of the population, health officials do not expect any outbreaks to reach the magnitude of those caused by Legionnaires' disease.

"Health professionals have gained an important lesson from these two unusual afflictions," said Mary Jane Benfari, Ph.D., an MGH bacteriologist who has been directing the hospital's laboratory studies of these diseases. "The lesson is that when an illness seems to be bacterial but the bacteria cannot be isolated by customary laboratory techniques, one cannot immediately assume, 'Well, it must be something else.'"

She said that if the organism cannot be grown on artificial media, the next step can be a return to the old-time procedure of using guinea pigs, which is the course followed in identifying Legionnaires' disease and the Pittsburgh Pneumonia.

After being injected with a disease-laden specimen, the guinea pig will "strain out" normal organisms in the sample and respond only to the offend-



Using an ultraviolet microscope, William P. Corbett, Supervisor of the MGH Serology Laboratory, examines a specially treated slide for signs of Legionnaires' disease. Rod-shaped organisms in highly magnified specimen at right are Legionnaires' disease bacteria.

Complex Birthmarks Sometimes Require Medical Treatment

Of all the organs of the human body, one in particular receives special daily attention.

With clocklike regularity, people wash, shave, paint, powder, or perfume their skin—the body's largest organ—to keep it clean, healthy, and attractive.

But any material covering an area of approximately two square yards (for the average adult) is bound to possess some flaws.

Contrary to such terms as "skin deep" or "skin and bones," which imply that the human hide lacks substance, an average segment of skin the size of a quarter contains a yard of blood vessels, four yards of nerves, 100 sweat glands, and more than three million cells.

In the light of such a vast and complex network, one can readily understand the possibilities of abnormal skin development.

Although commonly referred to as birthmarks, the flaws—generally an excessive buildup of some normal constituent of skin—can occur at any time of life.

An adult, for example, bears on his body an average of 25 moles. Although the groundwork for them begins during prenatal development, only a few are present at birth. Almost all appear

ing bacterium. This facilitates further tests.

An Instructor in Microbiology at the Harvard School of Public Health, Dr. Benfari stressed the importance of close collaboration between the physician and the laboratory staff.

"By discussing his feelings frankly about a strange illness and outlining what the possibilities might be," she said, "the physician can help guide the technologist toward using lab methods that are not routinely employed."

In late January at a meeting of the Northeast Branch of the American Society for Microbiology in Hyannis, Mass., Dr. Benfari joined Lawrence J. Kunz, Ph.D., Director of the MGH Bacteriology Laboratories, and Peter B. Smith, Ph.D., Chief of the Clinical Bacteriology Branch of the C.D.C., in conducting a special seminar on new diseases and the future of microbiology. ■

Deep-seated in the skin, the port wine stain, which may cover half the body, almost never disappears on its own.



before the age of 30. More than 95 percent of all adults have at least one mole.

One of the most common developmental defects, a mole is simply an overgrowth of pigment cells that darken the skin and protect it from too much sun. The buildup may originate at the base of the skin's outer protective covering (the epidermis) or within an inner layer of skin (the dermis) which contains the tissue's blood vessels, nerves, and other key components.

Moles may be flat or raised, smooth or rough, with or without hair, and they are uniformly brown or black. They grow as the body grows but do not spread and need no medical attention.

"Sometimes, however, a malignant melanoma [a highly dangerous form of skin cancer] develops within the mole and goes without treatment because the individual does not realize that a change has taken place," said Dr. John A. Parrish, an MGH dermatologist.

"The color furnishes an important clue. Any appearance of red, white, or blue within the normally brown or black mole should alert a person to consult a physician. The color change may be accompanied by notchings in the border of the mole."

Melanomas, which are potentially fatal, rarely occur in moles that appear after birth. The people at greatest risk are those born with large moles, such as a so-called giant, hairy, "bathing-suit" nevus (or birthmark) which covers a large area of a person's torso. Nevi of this type should be examined on a regular basis to detect any danger signs.

For reasons that are not understood,

blood vessels in the skin are sometimes overproduced during fetal development. This has led to a tiny percentage of babies being born with prominent birthmarks called hemangiomas.

Cavernous spaces in the skin may fill with blood and become visible to other people as reddish or purplish areas of the body.

One kind of hemangioma is called a nevus flammeus. It may be red and occur at the nape of the neck or on some part of the head. That form is often referred to as a "salmon patch" or "stork bite." Usually, it soon disappears.

Occurring much less frequently but causing much greater concern is a type of nevus flammeus known as the port wine stain.

Purplish because of being very deep-seated in the skin, the port wine stain can be the size of a coin or cover half the body. The lesion almost never disappears on its own, and surgical removal always entails some scarring.

Dr. Parrish, who is an Associate Professor of Dermatology at Harvard Medical School, also said that, in rare situations, port wine stains have been associated with neurologic disorders that can produce seizures, retardation, or other problems.

Another type of blood vessel abnormality in the skin is the strawberry hemangioma. Often more raised and more unattractive than the port wine stain and usually found in a conspicuous place, such as the face or neck, the

(Concluded on Page 8)



Birthmark Site May Compel Intervention

(Concluded from Page 7)

strawberry hemangioma nevertheless has a better outlook.

The appearance at birth or during the first few months of life of this spongy, enlarged mass extending above the normal skin surface usually gives rise to immediate parental appeals for surgery, X ray, or cryotherapy (chemical freezing) to get rid of the defect, but most often the best course is to do nothing.

This is because the strawberry hemangioma consists of immature blood vessels which usually regress after brief spurts of growth.

Regardless of how large and unsightly the strawberry marks become, three of every four will disappear during childhood, frequently within five years, without treatment. The skin will then look perfectly normal. Even the most severe marks will improve significantly.

"If a strawberry hemangioma occurred at a vital site, however, it might be necessary to prescribe high doses of steroids," Dr. Parrish declared.

"A fairly big hemangioma situated in an eyelid or around the nose or mouth may interfere with vision, breathing, or eating. Steroids can accelerate the normal shrinking process. Despite the risks of possible undesirable side effects from these drugs, their use in such an acute situation may be warranted."

Sometimes a cyst, a thick-walled skin cavity containing fluid or semisolid matter, may appear at birth. More often, they are detected later in life. They may vary greatly in size but generally they cause no harm. Pain from a cyst or sudden enlargement of it could indicate a bacterial infection, but treatment with antibiotics produces a rapid recovery.

Most of the time birthmarks create only cosmetic problems. After a physician has dispelled an individual's fear that a particular blemish is dangerous, the patient frequently will elect to forget about the flaw. If desired, makeup, specially tinted to match the color of the skin, can be applied to the mark.

If surgery is in order, it may be per-

formed by a dermatologist, a general surgeon, or a plastic surgeon, depending on where and how big the defect is and how complicated the procedure will be.

Some medical centers in the United States employ laser beams in the treatment of hemangiomas.

"The treatments seem to be moderately successful," Dr. Parrish said. "The hemoglobin [the iron-and-oxygen-bearing protein] in the blood absorbs the laser beam and then, by means of heat, the beam proceeds to destroy the blood vessel. Scarring is minimal, although sometimes there are other side effects."

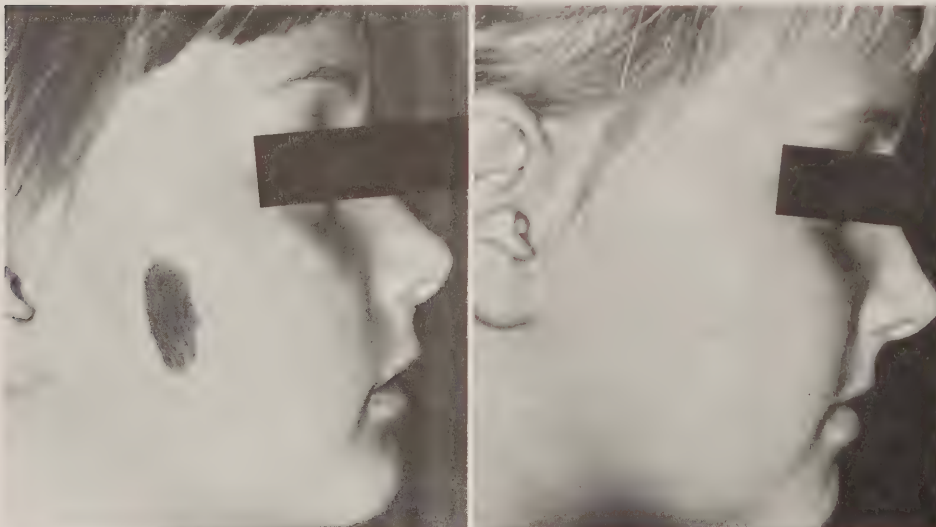
Some of the earliest experiments on the effects of lasers on the skin were conducted at the MGH by Dr. Parrish and colleagues in the Dermatology Department.

The work to improve laser technology and lessen the risk to patients is continuing in the MGH Photomedicine Laboratories under the direction of Dr. Parrish.

Although in rare instances birthmarks may be inherited, the cause of the vast majority is unknown. Superstitions die slowly, but the theory that external prenatal influences on the mother can produce birthmarks has long been disproven.

A book written for lay readers on the care and treatment of the skin discusses birthmarks in detail. Entitled *Between You and Me*, and published by Little, Brown and Company, the book was authored by Drs. Parrish, Barbara A. Gilchrest, formerly of the MGH and now of Boston's Beth Israel Hospital Dermatology Department; and Thomas B. Fitzpatrick, Chief of the MGH Dermatology Department.

Dr. Parrish also authored *Dermatology and Skin Care*, published by McGraw-Hill and earmarked mainly for members of the health profession. This book recently was translated into Spanish. ■



Born with a large mole on her cheek (left photo), this girl, at age 9, underwent plastic surgery which led to a much improved appearance (right photo, taken two years later).



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April, 1980

Positron Tomography Offers New Look at Disease

Arthroscopic Methods Ease Knee Repairs

Eleven years ago while attending the University of Massachusetts at Amherst, Walter Wells was playfully wrestling with a group of fraternity brothers and suddenly felt the weight of three of them crash down on his right leg, wrenching the knee.

Doctors later discovered a severe tear in the knee's inner cartilage (medial meniscus), one of two crescent-shaped wedges of connective tissue which serve as shock absorbers between the ends of the thigh bone and leg bone. The doctors recommended removal of all of the medial tissue.

After the operation, which required a knee incision nearly six inches long, Mr. Wells had to wait three days before mobility returned to the knee. He spent five days in a hospital and three months convalescing, alternating between the use of crutches and a cane.

Last July, the knee again gave way, this time because of a tear in the outer (lateral) meniscus. Not only had this tissue performed double duty in cushioning the bones but severe arthritis also had developed in the knee joint.

Mr. Wells dreaded the thought of another operation, but his second experience contrasted sharply with the first.

Arriving at the MGH Surgical Day Care Unit at 9 a.m., he underwent arthroscopic surgery by Dr. Dinesh Patel, an orthopedic surgeon, and was en route home by 4 p.m. Six hours later, Mr. Wells was able to exercise the knee, and after only one week of recuperation he returned to his job in the loan department of a Lynn, Mass., bank.

The procedure used in the second operation (an arthroscopic meniscectomy) spared the patient much discomfort and anxiety, minimized his time away from work, and saved him considerable medical expense besides.

Instead of cutting through extensive tissue to reach the damaged cartilage, Dr. Patel made two incisions, each only about one quarter of an inch long.

Through one, he inserted a slender optical instrument (arthroscope). Used with cool, reliable, fiberoptic lighting,

(Continued on Page 4)



Sara Monoson, 20, undergoing checkup by Dr. Dinesh Patel following arthroscopic surgery by him to remove torn cartilage from her right knee. Sara discarded crutches only one day after the operation, shown on page 5.

When CT scanners appeared in 1972, offering for the first time a "noninvasive" way to X ray soft tissues of the brain, the response of the medical profession was immediate and enthusiastic.

Quickly recognizing the value of a system capable of detecting brain disorders, such as tumors and blood clots, without injections of any kind, the MGH in August 1973 became the second institution in North America to install the device.

Today, as "computed tomography" holds an increasingly important role in medical care, providing valuable diagnostic data not only about the brain but other parts of the body as well, excitement is building anew among scientists.

The interest centers on six institutions that are applying, or preparing to apply, tomographic imaging to furnish information that conventional tomography cannot offer.

CT scanners show in detail images of body structures lying in a predetermined plane, or cross section, of tissue. Complementing this, the new technique, still being used for research purposes only, makes possible insights into disturbances in the function of human tissue.

Thus, conventional tomography will tell "what is there" while the new procedure, known as Positron Emission Transverse Tomography (PETT), will tell "what is going on"; that is, it will help demonstrate physiology, including blood flow and biochemical processes.

Positron studies can be particularly important in the management of diseases of the brain. "Neurological tests

(Continued on Page 2)



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EDITORIAL:

A Successful Marriage

Back in 1941 the MGH lacked a special unit for treating diseases of women. Vincent Memorial Hospital was then a small Boston women's hospital. The MGH, 130 years old at the time, felt it could better serve its patients if it provided a division that treated diseases peculiar to women. For its part the Vincent Memorial, already more than half a century old, could see in the long run a danger of foundering on economic rocks. Medicine was increasingly technological, and that technology was becoming difficult to support. Particularly so for an institution with only a small budget to bear the burden of needed but costly equipment. The solution was obvious, an affiliation between the general hospital and the women's hospital. Obvious, but not an easy decision for the gynecological institution.

Joining with the MGH would provide the Vincent Memorial Hospital with an admirable armamentarium of diagnostic and treatment facilities it could not otherwise afford. For its part the MGH was delighted to welcome the excellent women's unit that was so much needed. What made the decision so difficult for the Vincent was the fear of losing its identity in the huge MGH complex.

To some degree this would be inevitable. The very contrast in size of the two institutions would foster this. And yet the Vincent has managed to retain its identity. Largely this has been the logical extension of the pioneering efforts by the health professionals who staff the Vincent. Their contributions to patient care, research, and teaching are but outlined in an article beginning on page 6 of this issue. To no small degree, however, the hospital's continuing identity resulted from the dedication of the Vincent Board of Managers and of the Vincent Club. The board has charted well the course for its ship of state. The club members have raised more than \$2 million over the years to keep the ship afloat. And the MGH has provided the backup of a variety of specialists to give the Vincent outstanding support. Since patients who come to one division of the MGH often have more than one illness, a woman hospitalized in the Vincent Memorial frequently benefits from the diagnostic and treatment facilities of other areas of the MGH. Specialists in nongynecological fields are consulted in the care of Vincent patients. Clearly both the MGH and the Vincent Memorial have benefited. Of much more importance are the benefits that have accrued to patients.

Positron Tomography Might Help to Clarify Best Avenue of Care

(Continued from Page 1)

that demonstrate brain structure, such as CT, primarily are useful in helping to make a diagnosis," explained Dr. Robert H. Ackerman, an MGH neurologist and neuroradiologist. "PETT scanning, however, will increase our understanding of normal and abnormal brain function and may allow us to identify more effective treatment for many acute neurological diseases.

"For example, detectable physiologic changes that occur early determine to a large extent the eventual severity of structural damage. A CT scan might not show anything wrong in the first 12 hours or any major changes until days or weeks later when it is too late to try to treat the physiologic injury."

Knowing the physiologic changes that have occurred at the onset of a stroke might enable a physician to determine whether injured tissue can survive and to administer agents which might help restore normal function. Repeat positron studies would provide a means of quickly evaluating the effectiveness of the selected treatment.

Dr. Ackerman, who directs the MGH's Carotid Evaluation and Cerebral Blood Flow Laboratories, and two physicists in radiology, Nathaniel M. Alpert, Ph.D., and John A. Correia,

Letter to the Editor

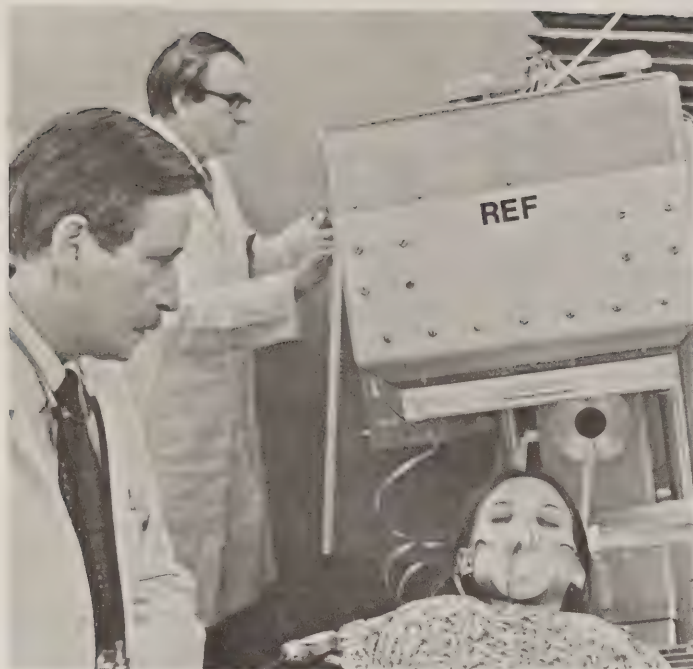
Dear Editor:

Re *Best Doctors in the U.S.*: It would be interesting to find out how many of them were MGH trained and now residing and practicing outside of the MGH. I bet you will find a goodly number to add to our proud MGH heritage. [The Jan.-Feb. *MGH News* reported that 38 physicians who currently practice at the MGH are among those named in the book.]

Yours is a fun journal to read.

Robert C. Coe, MD
Seattle, Wash.

[EDITOR'S NOTE.] A good suggestion. The News would be interested in learning the names of MGH-trained physicians listed in *Best Doctors in the U.S.* A check of the book shows that Dr. Coe himself is one.



Dr. Robert H. Ackerman (foreground), Nathaniel M. Alpert, Ph.D., and Susan Kulas, Blood Flow Laboratory technician, demonstrate use of Positron Emission Transverse Tomography (PETT) scanner.

Ph.D., have worked together for the past five years with a team of postdoctoral Fellows, technicians, and members of the MGH Physics Research Laboratory to develop and probe the potential benefits of positron imaging of the brain.

The brain studies have been funded largely by a National Institutes of Health grant given for establishment of an MGH Stroke Center, directed by Dr. Juan M. Taveras, MGH Chief of Radiology and Professor of Radiology at Harvard Medical School.

Dr. Ackerman is Associate Professor, and Drs. Alpert and Correia are Assistant Professors, of Radiology at Harvard.

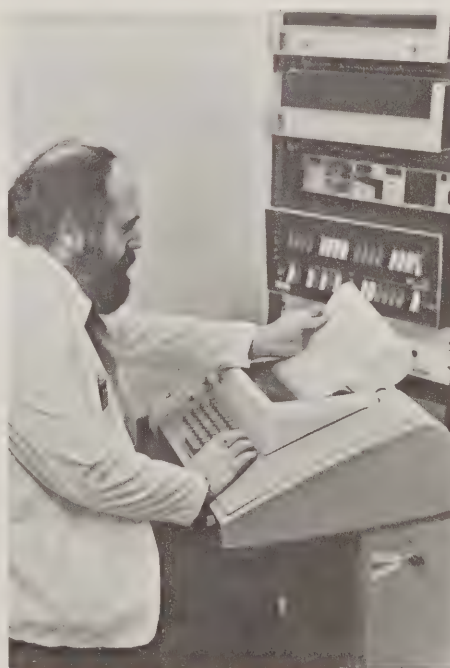
Brain positron studies at the MGH utilize a cross-sectional positron camera designed by Gordon L. Brownell, Ph.D., and his associates. Dr. Brownell, Director of MGH Physics Research, is a pioneer in the field of positron imaging. His laboratory developed one of the earliest positron imaging devices and over the years has contributed to numerous improvements in concepts and design of positron instrumentation.

The PETT technique involves the use of chemicals made radioactive by a large, circular device called a cyclotron. The chemicals can be used to label biologically active compounds such as ammonia, carbon dioxide, oxygen, and glucose, all normally found in humans. The labeled compound would then be given to the patient.

While accompanying the natural chemical through the brain, each radioactive substance used for a particular

test quickly decays and emits a positron, a positively charged particle that otherwise resembles an electron (which has a negative charge). The positron interacts rapidly with its antiparticle, an electron, causing both particles to be annihilated. This event creates two high-energy rays (photons) which speed away in opposite directions.

The positron camera detects activity on both sides of the patient's head. By identifying pairs of photons arising from a single annihilation event, the camera can proceed to form two- or three-dimensional images of the distribution of the labeled compound in the brain.



John A. Correia, Ph.D., obtains PETT test data after processing by computer.

The three-dimensional images provide cross-sectional views of these distributions so that one can determine blood flow and metabolism in known volumes of brain tissue at many brain levels.

"Before PETT studies, such determinations in small regions of brain tissue were not possible," said Dr. Alpert. Dr. Correia further pointed out that "nothing can happen in the brain without ultimately affecting blood flow and oxygen and glucose metabolism. They are critical to brain function."

Already, use of the positron technique, still a research tool, has prompted changes in diagnosis.

Not long ago, an 18-year-old patient developed sudden problems with his vision and was thought to have suffered a stroke. Complicating the picture, however, was a movement disorder which steadily worsened.

Although an angiogram (an X ray of blood vessels after injection of dye), a CT scan, and a lumbar puncture to study spinal fluid proved negative, a positron examination uncovered markedly abnormal chemical activity in an area where brain structures were intact.

The positron findings eliminated the stroke diagnosis and led to a change in the patient's treatment.

When Dr. Brownell, who is also Professor of Nuclear Engineering at Massachusetts Institute of Technology, began his MGH positron imaging studies back in 1952, he focused on the localization of brain tumors.

"We didn't need the sensitivity or crosswise sectioning capabilities of present-day positron devices," he said, "because the tumors might have 100 times the activity of normal cells in the brain. Now, in striving for earliest possible detection of disease, we're looking at variations in cellular activity of only 10 or 20 percent."

Before the MGH installed its own cyclotron in 1964, it obtained its radioactive chemicals from M.I.T. These agents are unavailable commercially

(Concluded on Page 4)

Photographs: Pages 1, 3, 5, Myron Daniels; [Drawing: p. 4 (upper), G. Miller Clark.] p. 4 (lower), courtesy of Dr. Robert H. Ackerman; pp. 6 (upper), 7 (lower left), MGH Archives; p. 7 (lower right), Harding-Clidden, Inc.; pp. 6 (lower), 7 (upper), 8, John Canny.

Arthroscopic Use In Knee Surgery Speeds Recovery

(Continued from page 1)

the arthroscope permitted direct viewing of the interior of the knee joint.

Through the second incision, Dr. Patel employed instruments to snip and extract the damaged portion of tissue. He also removed a number of bone chips.

"I remember suffering relapses every few weeks after my first operation," Mr. Wells declared. "My only discomfort after the second surgery was some pain as the anesthesia wore off. Once the pain subsided, it was smooth sailing."

The quick recovery of many patients who opt for arthroscopic surgery to eliminate knee cartilage problems stands as silent testimony to this relatively new technique.

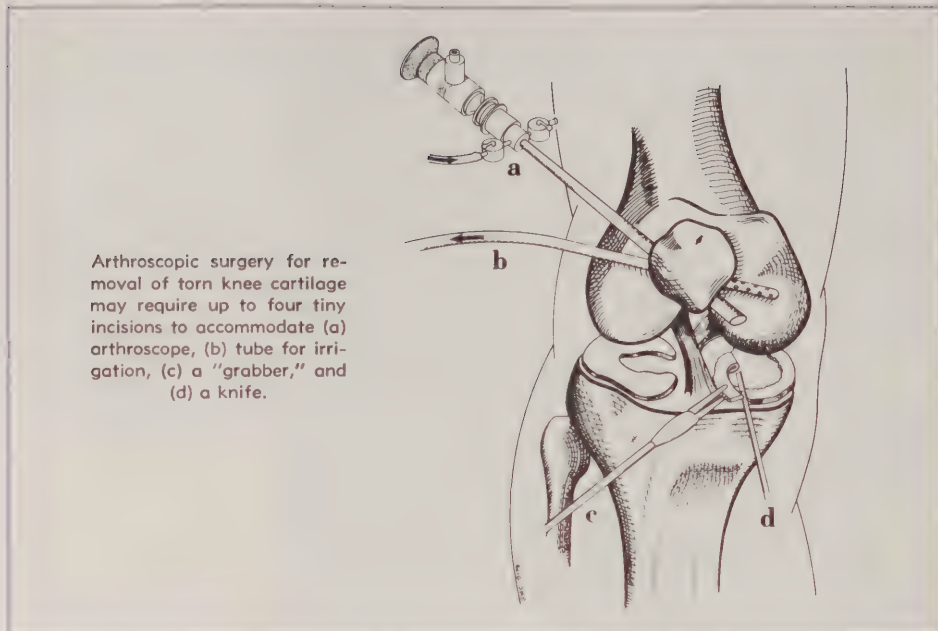
After undergoing an arthroscopic meniscectomy, one of Dr. Patel's patients resumed playing racquetball in

just 4 days, another returned to skiing in 10 days, and a young woman patient, with only 2½ weeks of rest, took up her 20-mile, long-distance runs again.

"If the injury remains untreated for an undue period, the patient probably will require a longer convalescence after the surgery," said Dr. Patel, a Clinical

Instructor in Orthopaedic Surgery at Harvard Medical School. "But in general if the treatment is prompt, the patient will rely on crutches or a cane for no longer than a week and probably will need little, if any, physical therapy."

Although the concept of using an arthroscope to probe the inner workings



Arthroscopic surgery for removal of torn knee cartilage may require up to four tiny incisions to accommodate (a) arthroscope, (b) tube for irrigation, (c) a "grabber," and (d) a knife.

Positron

(Concluded from page 3)

because they lose their radioactivity within minutes. Until the MGH opened its cyclotron, even the comparatively short distance between the two institutions thus created a problem.

Washington University in St. Louis,

with a cyclotron that was the first of a handful in the country specifically designed for medical use, shares pioneering honors with the MGH in devising PETT scanning processes.

U.C.L.A. and the University of Pennsylvania (working with Brookhaven National Laboratory) also have made important contributions in positron research. Other centers, such as Johns

Hopkins University and the University of Michigan, are about to enter the field.

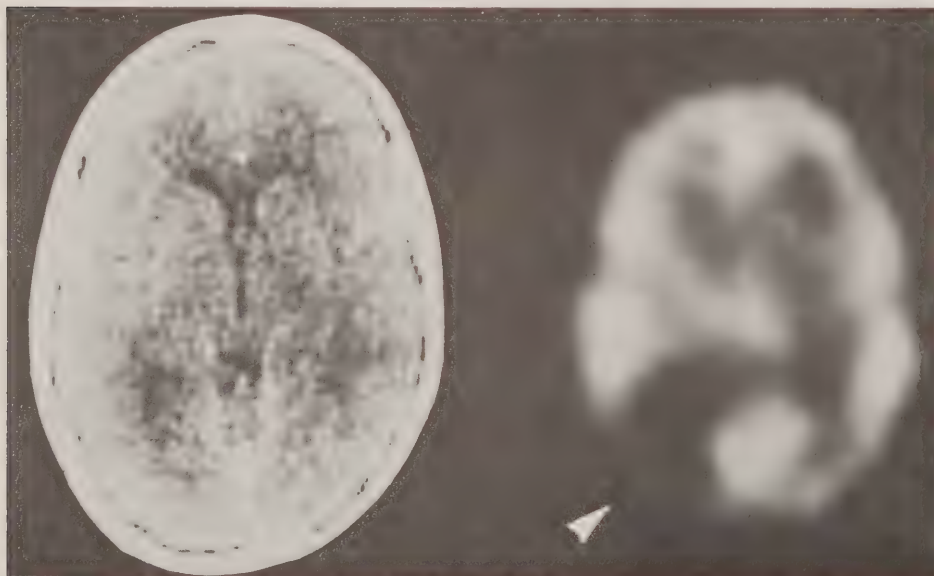
In addition to conducting positron studies of the brain, investigators at the MGH are looking into ways that the PETT system might help physicians specializing in heart and lung diseases, as well as in planning radiation treatments for cancer.

Dr. Brownell pointed out that one of the great strengths of positron tomography is that, in principle, there are as many different radioactive drugs which can be tagged to substances in the brain, for example, as there are natural compounds in the brain. Through PETT, each radioactive chemical would provide its own set of data.

Scientists express hope that in adding to the knowledge of how the brain works PETT may help one day to clear up the mysteries surrounding disorders such as schizophrenia, Huntington's disease, Parkinson's disease, and senility.

"The technology advances continually," said Dr. Brownell. "Right now, we're building a new, more sensitive, imaging system."

"No one knows where positron research will eventually lead, but the results being obtained today are very encouraging." ■



CT scan (left) of young patient admitted with brain disorder shows normal brain structures. However, a positron image of the same tissue (right) reveals a large, dark area of depressed blood flow (arrow). Physiological images lack the pictorial sharpness of structural ones.

of a bodily joint dates to 1918 when a scientist at Tokyo University initiated the studies, arthroscopy took a firm foothold in medical care only within the past several years.

The major credit goes to the development of fiberoptic lighting. This safe and dependable light source opened the doors to revolutionary advances in techniques for examining many interior parts of the body (*MGH News*, October 1978).

Among the first surgeons in the country to use the arthroscope, Dr. Patel has employed the instrument in the care of about one thousand patients since 1974.

During the first two years, only diagnosis was possible. Then as better optics and smaller, more sophisticated scopes became available, the advantages of the arthroscope in surgery became apparent.

Fueling medical interest in the benefits of arthroscopic procedures was an astronomical rise in the number of Americans participating in athletics. As sports injuries increased (with knees high on the list of joints affected), the MGH Orthopaedic Service established a Sports Medicine Clinic, codirected by Drs. Patel and Bertram Zarins (*MGH News*, October 1976).

Surgeons are unable to treat torn knee ligaments arthroscopically, but such injuries are much less common than lacerated menisci cartilage.

In addition to serving as a cushion or shock absorber, the meniscus provides stability to the knee, filling space in the joint as the knee is flexed up, down, or to the sides. By compressing and ex-

panding, the meniscus also serves as a pump to distribute nutrients and lubricants to all parts of the joint.

More often than not, the tear in the cartilage occurs on the inner rim of its crescent-like form. With the outer periphery intact, the surgeon can remove the damaged area without compromising the future capability of the cartilage to perform its assigned roles.

With the patient under general anesthesia, the orthopedist may make as many as four incisions to accommodate his scope, various tools such as a probe, grabbing instrument, scissors, or knife, and a tube for irrigation. Depending upon the nature of the injury, the operation may take a few minutes or more than an hour.

Because of the comparative newness of the surgical procedure, some of the necessary instruments already have undergone modifications. Dr. Patel, for example, uses a half dozen tools which he helped to design.

"They are lighter, thinner, sharper, and curved better than the original devices, and therefore they contribute to speedier progress of the operation and a better outcome," said the doctor, who also heads the Sports section of the Massachusetts Medical Society.

Facilitating the operation further is the optional use of a television monitor. Instead of peering directly into the scope, the surgeon may elect to attach a TV camera to it and perform his work guided by pictures flashed on a large TV screen. One special benefit of this is the ability to videotape the operation for a permanent record and use later in

instructional lectures.

Arthroscopic surgery has its critics. Some claim that total or near-total removal of a damaged cartilage is the best course because nature will then replace it with another form of tissue, a fibrocartilage. These doctors feel that the arthroscopic technique is too complicated to assure a complete removal.

Advocates of arthroscopic surgery, such as Dr. Patel, insist, first of all, that it can, if necessary, carry out the job.

Secondly, they feel the substitute cartilage is too small and too weak to properly accommodate weight transmission in the knee joint. Preserving as much of the meniscus as possible to continue serving as a stabilizing element is much more preferable, they contend.

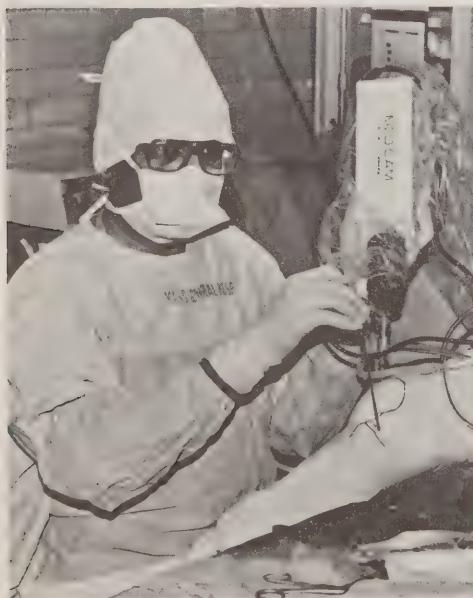
And then the pro-arthroscopic forces point out how their methods not only eliminate unsightly scarring but also quicken rehabilitation of the patient.

Heightened interest in arthroscopic work was evidenced last year by responses to a questionnaire circulated by the American Academy of Orthopaedic Surgeons to its members. To help arrange a number of courses, the Academy solicited preferences. Courses related to the knee led the list. Those specifically involving arthroscopic surgery drew capacity enrollments.

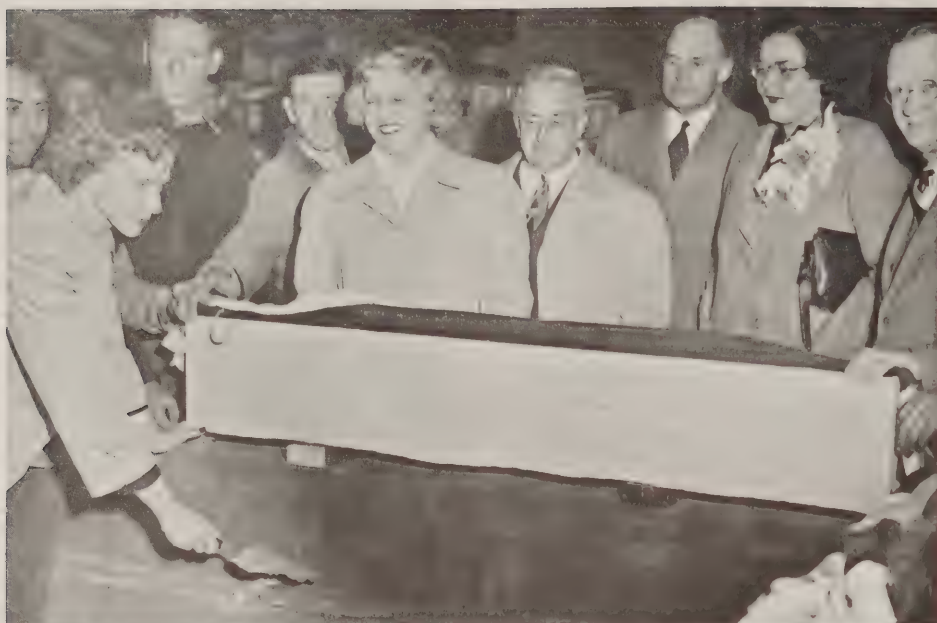
Of nearly 13,000 orthopedic surgeons in the United States, only about 200 regularly employ arthroscopic operating techniques in their practice.

To this, Dr. Patel comments:

"Four years ago, you would have been able to count the number on the fingers of your hands." ■



Dr. Dinesh Patel often performs knee cartilage surgery with the aid of a hand-held color TV camera attached to the arthroscope. Pictures relayed to a monitor (center) offer a broad view of the knee's interior. Photo at right shows torn cartilage moments after removal from patient's knee.



Wielding a trowel for the Vincent Memorial Hospital cornerstone in 1946 was Miss Dorothy Rackemann, then incoming President of the Vincent Club and now Hospital President. Other dignitaries: from left, Mrs. Henry McB. Parker, then President, Hospital Board of Managers; the late Joseph Spang, Board of Trustees; the late Harry Everett, President, Board of Trustees; Mrs. Samuel H. Hollowell, then outgoing President, Vincent Club; and the late Dr. Joe V. Meigs, the hospital's Chief of Staff.

THE VINCENT MEMORIAL:

A Leader in Treating Diseases of Women

In a century when women's liberation was unknown, women doctors in Boston staffed a hospital solely for women. Even the chief of staff was a woman.

Today the staff includes both sexes, and the hospital, the Vincent Memorial, observes the 90th anniversary of its founding. For its last 39 years, the institution has served as the gynecological unit of the MGH.

Internationally known for its treatment of women's diseases and its research on cancer in women, and more recently for its work in combating the problem of infertility in both women and men, the Vincent was established Dec. 12, 1890, by friends of Mrs. James R. Vincent as a memorial to the renowned Boston actress.

The original hospital was situated at 44 Chambers St. in Boston's West End, only blocks from the MGH campus. Expanded in 1899, the hospital moved in 1908 to larger quarters on South Huntington Avenue.

"From its beginning, the Vincent has been unique," said Dr. James H. Nelson, Jr., present Chief of the Vincent Memorial Hospital. "Specialization as we know it has really been a post-World War II phenomenon. But the hospital, by specifically treating the problems of women, was one of the leaders in this field."

Within two years of the Vincent's founding, the Vincent Club was formed to raise money. In April 1892, the club raised \$829 through the first of what has become annual theatrical productions.

Today, with a membership of almost 2,000 women, the club continues to support all the hospital's activities and has donated more than \$2 million to the Vincent.

Dr. Joe V. Meigs, regarded as the



Ronald Clement, Vincent laboratory technician, conducts a test to measure levels of hormones in blood.

driving force behind many of the Vincent's advances, became the first male Chief of Staff in 1931, just 12 years after the institution opened its regular staff to men.

Although small, the Vincent earned a reputation of furnishing skilled and kindly care.

However, in the 1930s, the hospital was finding it increasingly difficult to carry on alone. Laboratories, X-ray, pathology, and other departments necessary for providing modern methods of diagnosis and treatment were too expensive to serve so few patients.

In 1940, the Board of Trustees of the Vincent Memorial Hospital accepted an invitation to have the hospital become the MGH's gynecological unit, at the same time retaining its own identity and staff. In 1941, the Vincent moved to the MGH's White Building, remaining during World War II.

The MGH's General Executive Committee welcomed the long-awaited establishment of a gynecological service at the hospital. For its part, the Vincent gained the diagnostic facilities of a large and prominent general hospital.

In addition, the affiliation gave the Vincent staff more opportunity to delve into research in which it had already showed interest.

"As long as the Vincent continued as an isolated institution, enough attention would not have been paid to the problems of cancer in women or would real surgical advances have been provided," said Dr. George S. Richardson, an MGH-Vincent gynecologist.

To effect the affiliation, Dr. Meigs, Chief Surgeon at the Vincent and Surgeon at the MGH, was appointed Chief of the new Gynecological Service as well as Clinical Professor of Gynecology at Harvard Medical School, thus opening the way for the establishment of a teaching service.

The Vincent opened its new building on Nov. 28, 1947, on the first three floors of the Vincent-Burnham Building.

Nested in its new quarters, the Vincent could expand its research.

Under the leadership of Dr. Meigs, the Vincent had already fostered its reputation as a pioneer in treating cancer of the female genital tract.

Dr. Meigs' 1934 book, *Tumors of the Female Pelvic Organs*, is considered by some as the foundation of this field. His observation that seemingly hopeless patients with ovarian tumors could in fact

have readily curable benign tumors has become a standard part of gynecological teaching. This condition has been given the name of the Meigs syndrome.

"These tumors are not common," Dr. Nelson said, "but are probably one syndrome that virtually every physician is familiar with, whether a gynecologist or not."

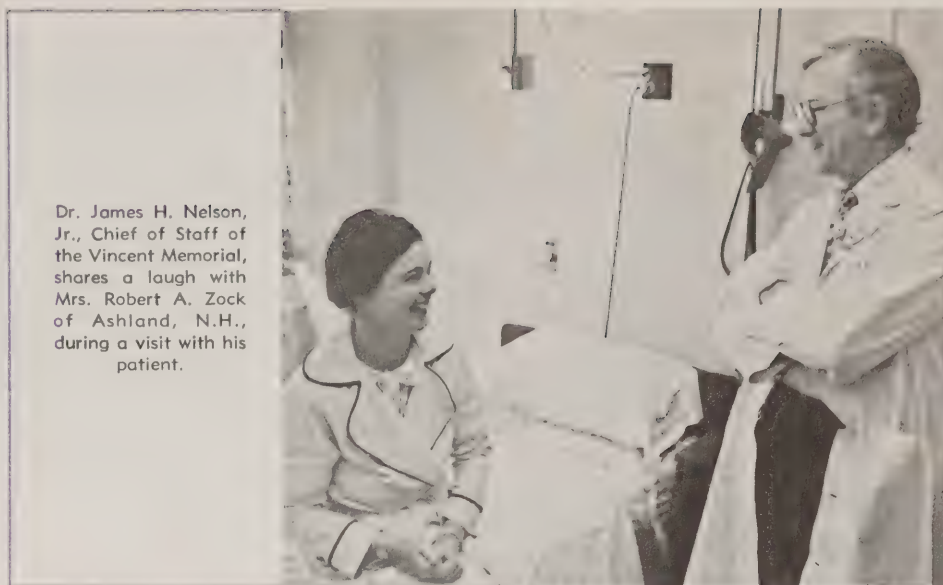
In addition, Dr. Meigs, along with Dr. Somers H. Sturgis, then of the Vincent staff, in 1946 began editing *Progress in Gynecology* as a refresher course for doctors returning from World War II. Now in its sixth volume, *Progress in Gynecology* is coedited by Dr. Thomas H. Green, Jr., an MGH-Vincent gynecologist.

Dr. Meigs also reintroduced radical surgery in the treatment of cancer (carcinoma) of the cervix. First introduced near the turn of the century, radical surgery proved less effective than radiation therapy because of the lack of blood banking and lack of sophistication in anesthesia.

"Carcinoma of the cervix is a common disease and one that occurs in young women," Dr. Nelson explained. "Up until Dr. Meigs reintroduced radical surgery, this disease was being treated by radiation, which destroys the ovaries whereas surgery does not."

Further treatment of carcinoma of the cervix (pelvic exenteration) was introduced to the Vincent by Drs. Meigs, Howard Ulfelder, and Langdon Parsons.

A major achievement came in 1941



Dr. James H. Nelson, Jr., Chief of Staff of the Vincent Memorial, shares a laugh with Mrs. Robert A. Zock of Ashland, N.H., during a visit with his patient.

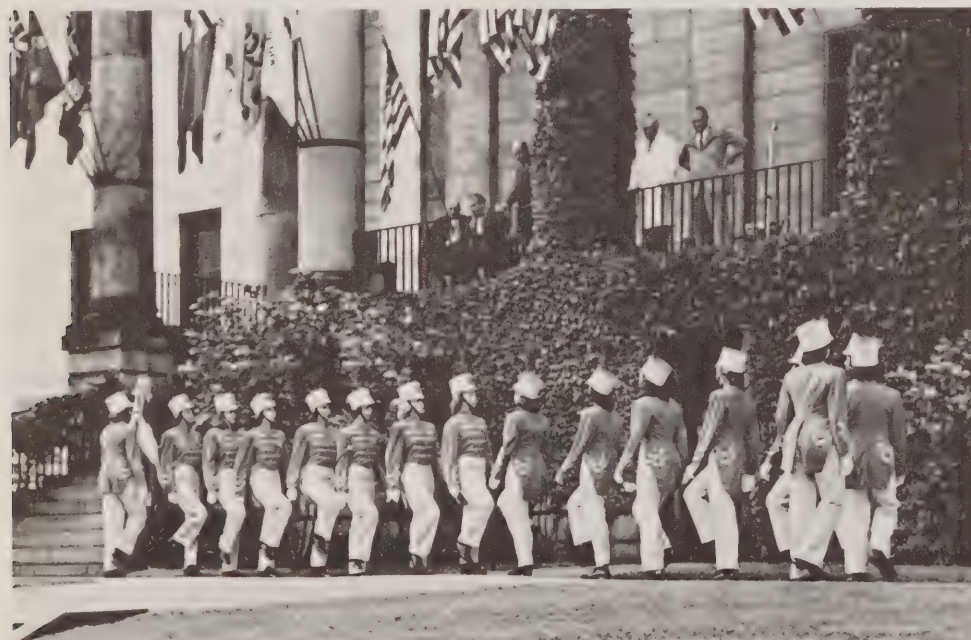
with studies conducted by Dr. Maurice Fremont-Smith, an internist, and Ruth M. Graham, Director of the Vincent's Cytology Laboratory, on a method of detecting early vaginal cancer through smear (Pap) tests developed by Dr. George N. Papanicolaou of Cornell University and New York Hospital. The Vincent work has been credited with hastening the acceptance of this lifesaving procedure by the medical world. In addition, Dr. Fremont-Smith's and Mrs. Graham's research led to the founding of the Vincent Research Laboratory.

In a study initiated by Dr. Meigs' successor, Dr. Ulfelder, the hospital linked diethylstilbestrol (DES) treatment for the maintenance of pregnancy

with the occurrence of cancer many years later in female offspring of mothers who used it.

As a result of the research headed by Dr. Arthur L. Herbst, and including at various stages Drs. Ulfelder, Robert E. Scully, and David C. Poskanzer, the United States Food and Drug Administration in 1971 halted the use of DES for avoiding miscarriage. This study has continued at the MGH under the direction of Dr. Ann B. Barnes, a gynecologist, and Dr. Stanley J. Robboy, a pathologist, (*MGH News*, November 1979).

An investigation begun by Dr. Green assisted in the eventual treatment of urinary stress incontinence, a common
(Concluded on Page 8)



Vincent Club traditions date almost to the founding of the Vincent Memorial Hospital. At left, during Volunteer Day, June 14, 1945, the club's military drill, still an integral part of the annual Vincent Show. In photo at right, Mrs. Kingsley Brooks (left) and Miss Lindsay Jordan are shown at rehearsal for this year's club program, "Fit to Print."

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Vincent Memorial Earns Research Honors

(Concluded from Page 7)

and personally distressing ailment whereby women lose urine with stress, such as a cough, sneeze, or even hearty laughter. Severe enough to keep some women housebound, the problem is correctable by three surgical procedures. Dr. Green devised a way to determine which of these operations is best in an individual situation.

Since Dr. Meigs began treating endometriosis, a noncancerous disease in which the lining of the uterus (endometrium) becomes implanted outside the womb causing pain and infertility, the hospital has become a worldwide center for the study of infertility.

To attack this problem Dr. Ulfelder improved surgical treatment for endometriosis.

Dr. Janet W. McArthur, an MGH-Vincent endocrinologist who was attracted to the study of gynecological problems, developed a procedure to measure the levels in urine of a messenger substance called LH (pituitary lutenizing hormone). This technique enabled her to do three things.

First, she identified the mid-men-

strual cycle surge of LH that triggers ovulation. Second, she recognized that women who no longer menstruate have higher levels of LH as well as of another messenger substance called FSH (pituitary follicle-stimulating hormone). Third, she described the LH abnormalities that characterize in women an important cause of infertility that is known as polycystic ovary syndrome.

Dr. McArthur has also demonstrated with the bonnet monkey the importance of cervical mucus in transporting sperm into the uterus and the Fallopian tubes, where fertilization takes place.

A pioneer in the study of infertility was Dr. Francis M. Ingersoll, a Vincent gynecologist, whose research and subsequent journal articles with Dr. William V. McDermott, Jr., on the Stein-Leventhal syndrome was of great assistance to Dr. McArthur's later work. The syndrome, a hormonal imbalance causing irregular menstrual cycles, can lead to infertility in women as well as the growing of unwanted and potentially embarrassing hair, such as a beard.

At the Vincent another staff member, Dr. Albert F. Parlow, began research which led to characterizing the chemi-

cals in the hormones FSH and LH, important in establishing an early testing system for measuring gonadotropins. Dr. Frederick A. Simmons, also of the Vincent and formerly the first president of the American Fertility Society, developed a method (testicular biopsy) to explain the male factor in infertility.

Ongoing work in infertility includes studies by Dr. William F. Crowley, Jr., Dr. Inese Z. Beitins, Thomas M. Badger, Ph.D., and Dr. McArthur.

Dr. McArthur has also expanded her research to include the study of effects of athletic training upon menstrual cycling and the relative contributions of diet, stress, and athletic exertion upon the hormonal patterns that underlie fertile cycling (*MGH News*, December 1979). A most informative study on the sequence of events around the onset of puberty and menstruation in girls was carried on over a recent 10-year period by Drs. Leona Zacharias and Richard J. Wurtman of the Vincent staff.

Research presently being done in other areas includes work by Dr. Richardson and David T. MacLaughlin, Ph.D., to shed light on the action of the hormone progesterone in cancer treatment.

In the field of education, the Vincent was in the 1950s one of the first hospitals of its kind to begin a postgraduate course in gynecology.

The hospital most recently has forged an alliance with the Endocrine Unit of the Department of Medicine which will involve patient care, research, and training. In addition, Dr. Nelson has begun a residency program in obstetrics and gynecology which will have a full complement of eight residents later in the year.

"This will automatically prove to be advantageous to the patient and also increase the scope of research and the number of projects we become involved with," Dr. Nelson said. "We are also looking to the future with plans for other major advances in patient care." ■



In his Vincent Memorial laboratory, Thomas M. Badger, Ph.D., carries on infertility studies, an area of research in which the hospital has become world known.



MGH *News*

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May, 1980

New Implantable Pump May Support Ailing Hearts

Inability to Cope Can Endanger Health

Inflation in the United States soars at its highest rate in 33 years. . . .

In the last decade alone, the cost of living doubled. . . .

East-West detente, the chief hope for curbing the nuclear arms race, is shaky after Russia's military incursion into Afghanistan. . . .

America's youth are split on the question of registration for a possible future draft. . . .

The republic is entering the 1980s amid much uncertainty. If one thing seems clear in an otherwise clouded picture, it is that Americans face episodes of considerable stress.

Stress is a part of living. Love and hate, marriage and divorce, joy and sadness, success and failure, birth and death all evoke tensions. People who normally deal well with stress will better meet the challenges of the future. For the sake of their health, physical as well as mental, others must learn how to cope with new and increased pressures.

Stress alters the function of many parts of the body, including the brain, muscles, and internal organs. Hormones from the pancreas, pituitary, thyroid, and adrenal glands all play roles in emotional tension.

In so-called normal stress—as experienced by the athlete vying for a victory, the thrill-seeker riding a roller coaster, the motorist just involved in an accident, the employee struggling to meet a deadline, or the job applicant late for an appointment—the body is strong enough to cope and recover quickly. In fact, well-controlled stress

can prove beneficial by “psyching up” the athlete or employee, for instance.

Excessive or prolonged stress, however, can precipitate conditions such as high blood pressure, heart disease, ulcers, backaches, joint and muscle pains, and a variety of skin disorders.

If the emotional upheaval were extremely prolonged and severe, the result might be cardiac arrest (heart stoppage) or a heart attack.

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Being caught in a traffic tie-up while hurrying to work or an appointment can frazzle anyone's nerves.

MGH heart surgeons and Avco Corporation scientists, working as a team, have developed a device which may one day prove lifesaving for many victims of heart disease, America's number one killer.

Each year in the United States, countless thousands die because disease has destroyed the ability of their heart to pump blood, newly supplied with oxygen, back into their arteries.

Since the mid-1960s, researchers have tried to design and build a device which would offer reliable, long-term, mechanical support when the workhorse of the heart, the left pumping chamber or ventricle, fails.

Despite considerable progress, the scientists had encountered a persistent obstacle. Various materials used in constructing experimental pumps caused unacceptable damage to blood as it flowed through the artificial system.

The MGH-Avco investigators believe they have solved that problem by producing an implantable Left Heart Blood Pump made of a special plastic called Avcothane and designed so that the entire blood-contacting interior forms a continuous surface.

The team stresses, however, that although encouraged to date by the results of laboratory and animal tests of the dome-shaped device, at least one or two years' work remains before it can be considered ready for human trial.

Working on the joint venture from the MGH are Drs. W. Gerald Austen, Chief of General Surgical Services; Mortimer J. Buckley, Jr., Chief of the Cardiac Surgical Unit; and Frederick H. Levine of the Cardiac Surgical Unit.

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EDITORIAL:

On the Trials of Imitating Nature

In the 1960s the National Institutes of Health (N.I.H.) funded studies to determine the feasibility of developing a totally implantable artificial heart. The idea *seemed* feasible. The heart is essentially a pump—a marvelous device that beats some 2½ billion times in an average lifetime, but nevertheless a pump. Since a pump is a mechanical device, man should be able to duplicate the heart. Certainly science has developed a variety of ingenious pumps since the start of recorded history.

The reports came back to the N.I.H. in 1966, and they were optimistic. Yes, man could build a heart that could substitute for a human one too sick to function. Moreover, the task could probably become reality in five to ten years.

First, however, came the heart transplantation in South Africa and the concomitant enthusiasm which heralded it. Still that failed to dampen the scientific optimism for the artificial heart. Transplanted hearts are difficult to obtain because permission to donate the organ usually must come from a dying patient or through his relatives. The transplanted heart must be healthy. With present knowledge even if a suitable donor can be found, the recipient's body may reject the organ. Or the battle against rejection may lead to overwhelming infection.

By contrast, the artificial heart is disease free. It can be mass produced, and it avoids the rejection problem. Because no drugs are needed to fight rejection, the body's resistance to infection remains intact. Sounds ideal! In fairness, the N.I.H. feasibility studies clearly indicated that investigators would have to overcome some major obstacles to devise a suitable artificial heart. Some of these proved more formidable than many researchers anticipated.

As a result of these difficulties, the present immediate thrust aims at a practical device to replace only the left lower chamber of the heart. A practical left ventricle would be no small achievement. Since this chamber is the heart's workhorse, its development would save thousands of lives each year.

A front page article in this issue describes the latest attempt to produce a reliable left ventricle. Investigators at the MGH and the Avco Corporation are optimistic. At the same time, they recognize that they have much work before the pump is ready for use in humans.

Indeed the history of artificial heart research reminds us again that imitating nature is a lot harder than we care to admit.

Heart Pump Design Earns Good Marks In Battery of Tests

(Continued from Page 1)

Program directors from the Avco Everett Research Laboratory, near Boston, are David M. Lederman, Ph.D., Chairman, Medical Research Committee, and Param I. Singh, Ph.D. Avco team coinvestigators include Robert C. Cumming, Frederick B. Russell, and Russell A. Morgan.

Before developing their own device, the joint team studied other ones being investigated elsewhere. The conclusion: lethal blood clots formed both because of the materials being used and because pools of blood tended to develop at junctions of various parts of the other pumps.

Dr. Lederman said that Avcothane, which has an elastic-like quality, exhibits the high degree of compatibility with blood that is necessary to minimize blood damage under the flow conditions inherent in a well-designed pump.

All blood-contacting surfaces, including inflow and outflow three-leaflet valves which emulate the heart's natural aortic valve, are made of Avcothane and contain no seams, junctions, steps, or other possible obstructions to blood movement.

In addition, Avcothane has passed stringent tests to assure long-term durability under such conditions as bending stresses, temperature fluctuations, and chemical attack.

"We spent years studying the interaction of blood and various materials," said Dr. Lederman, who originated the pump's design. "The results of these very fundamental studies made us confident that we could fashion an implantable device which could operate without the danger of causing blood clots or other damage. The pump's material and unique design eliminate the need for any anticlotting drugs."

Avcothane is the same plastic used in the manufacture of the MGH-Avco

Photographs: Pages 1, 4, 5, courtesy of Boston Herald American: p. 3 (upper), courtesy of Avco Everett Research Laboratory; p. 3 (lower), Myron Daniels; pp. 6, 7, 8, courtesy of Dr. Thomas S. Durant.



Inner surfaces of Left Heart Blood Pump, including two artificial aortic valves, are made of Avcothane, a special plastic which minimizes chances of blood damage.

intra-aortic balloon, a tool first used by MGH heart surgeons 10 years ago to assist patients with weakened left ventricular function (*MGH News*, May 1971).

Threaded through a distant artery into the aorta (the body's main artery) near the heart, the 10-inch-long balloon, controlled externally, pumps when the heart's left ventricle is resting and remains inactive while that ventricle is pumping. As a result, the left ventricle needs less pumping pressure.

Dr. Buckley cited the balloon as an excellent example of how well a close working relationship between physicians and engineers can pay off.

"Medical people tried by themselves to develop balloons as early as 1962," he said. "The devices seemed to work in animals but couldn't be made efficient.

"The original balloon, which looked like a short, fat sausage, tended to inflate unevenly, first at the ends and then in the center, thus trapping blood between the balloon and the aortic wall. The problem was solved by building a balloon with three inner compartments and causing the center one to inflate first. So it wasn't until good engineering and good physics, especially, were introduced that balloon pumping really became effective."

Although the balloon and the new pump have the same general purpose, the balloon is a temporary expedient and can be useful only if the heart's natural pump is still active. Avco's new system is designed to take over the work of the left ventricle completely.

Last fall, papers describing the pump were presented at the annual meeting of the American Heart Association in Anaheim, Calif., and published by the European Society for Artificial Organs, in Geneva, Switzerland.

Although it would be available for short-term (a week or less) application, the new device was engineered primarily for long-term service. The National Institutes of Health, which funds the project, called for a system capable initially of at least two years' uninterrupted use.

In December 1978, a surgical team headed by Dr. Levine began testing the new pump by implanting it into calves at the Avco laboratory.

The first tests were of brief duration to carefully study specific aspects of the pump's operation. The investigators

sought to learn, for example, how well an exterior sheathing of rigid polyurethane plastic was reacting to contact with body tissue, and whether stainless steel rings used to reinforce the inflow and outflow conduits were adequate. The rings are embedded within the Avcothane.

Satisfied with the results, the team began longer experiments, again with calves, to determine if the pump could work smoothly for 45 days. This goal has since been met, and plans now are being made for 90-day tests. Gradually, the animal trials will stretch into longer periods of time.

Despite the fact it received no anti-clotting drugs, one animal, affectionately called "Elly," has lived for the past year with an artificial Avcothane aortic valve implanted in her heart. Only two months old when the experiment began, "Elly" now weighs nearly 1,000 pounds.

"When problems with thrombosis [clotting] occur, they usually develop around valves, but in all of our laboratory subjects, 18 thus far, we have never encountered a single valvular thrombosis," said Dr. Lederman, who with Dr. Singh are coprincipal investigators under the N.I.H. contract.

Dr. Levine said that initially as many as 10,000 heart patients a year might be considered as candidates for the MGH-Avco pump. They would be persons unresponsive to any current modes of assistance.

The patients would be suffering severe, irreversible problems of left ventricle function. The reason? Widespread coronary artery disease, valvular disease, or a breakdown of heart muscle

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When photographed at the Avco Everett Research Laboratory, this calf had lived for 37 days with the MGH-Avco pump taking over the left ventricular pumping action of the animal's own heart. Tubing shown entering the calf's back is delivering pneumatic power to the implanted device.

Treatment for Strain Often Involves More Than Just Relaxation

(Continued from Page 1)

The intense, competitive, hard-driving individual fits into what doctors term the "Type-A personality," believed to be the leading psychological risk factor for heart disease.

Dr. Joel E. Dimsdale, an MGH psychiatrist who has devoted 10 years to the study of coping with stress, said recent reports indicate that up to 65 percent of America's population fall into the Type-A category. The estimate used to be 50 percent.

Dr. Dimsdale explained that "some people are so driven they just cannot relax. To them, slowing down means dreaded idleness. They need assistance in learning how to restructure their time with alternative activities."

Various relaxation techniques, hyp-



Coping with stress is a part of living.

nosis, biofeedback, and informal group discussions all have a place in alleviating stress, but that does not mean what is good for one is good for all. Each individual's unique driving force behind his stress needs to be identified.

One of the first physical reactions to

stress is an increased output of certain hormones (catecholamines) by the body's brain, adrenal glands, and nerves.

Only recently have sufficiently sensitive methods been developed to measure levels of the catecholamines, epinephrine and norepinephrine, in

Heart Pump

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(cardiomyopathy) due to a virus, alcohol, or some undetermined cause.

Regardless of the new heart pump, there always will be a place in medicine for the intra-aortic balloon, according to Dr. Levine.

If a patient's faltering heart had any chance of recovery, doctors would probably opt for the balloon's assist before turning to the artificial pump.

Since 1970, thousands of balloons, including more than 60,000 made by Avco, have assisted the pumping action of ailing hearts, often rescuing patients from the deadliest complication of a heart attack, cardiogenic shock. This is a drastic collapse of blood pressure brought on by damage to the left ventricle.

About two-thirds of the balloon pumps used in America are the model developed by Avco and the MGH.

"We can insert and remove a balloon easily," said Dr. Levine, who is Assistant Professor of Surgery at Harvard Medical School. "The problems are much different with a heart pump. It must be attached directly to the heart, already injured by disease.

"As far as risk from implanting the pump is concerned, any surgical procedure would create some hazards, but

I think in terms of the types of patients we would be dealing with and their ultimate prognosis, almost certain death, the risk has to be considered relatively small."

While the pump would provide significantly more support than the balloon, the question essentially comes down to how much relief will the heart actually need.

In the experiments being conducted at Avco, external air (pneumatic) power drives the implanted pump. Eventually, when used over the long term, the device will be operated by liquid (hydraulic) power. The system—an electric motor, liquid pump, and blood pump—will be entirely implanted and weigh a total of about one pound.

Already the left ventricle developed by Avco and the MGH is much lighter than those few being experimented with in America.

Dr. Lederman estimated that the system would normally operate on 10 or 12 watts of power. The chronic patient would wear a battery pack at the waist, and a half-dollar-sized transformer would supply electricity to the implanted motor without any need for openings in the patient's skin. Such openings carry a risk of infection.

"The state of battery technology today is such that the patient probably would be able to use the same power pack for three months, with daily re-

charging," Dr. Lederman said.

As far as availability of the pump for human use, the Avco scientist expressed belief that "between one and two years from now" is a reasonable target for short-term application. Long implantations in humans, he said, may be 6 to 10 years away, but he added:

"The problems associated with implanting a left ventricular assist device are not much less than those of implanting a total artificial heart."

The total artificial heart, taking over not only the left ventricle but also the right, which sends blood to the lungs to discharge carbon dioxide and receive oxygen, has been a major medical goal for more than 15 years.

However, Dr. Buckley, who is also Professor of Surgery at Harvard Medical School, said "time has shown us that, practically speaking, total replacement may not be that necessary."

He pointed out that 90 percent of heart patients have coronary artery disease, and of those in this group who die from this problem a vast majority succumb from left ventricular failure.

"I think," Dr. Buckley concluded, "that in the total spectrum of patients with heart failure, a proven left heart bypass system would solve the problems of more than 50 percent of those patients for at least a period of time. Only the future can tell us how long that period will be." ■

people as they go about their daily work.

The two substances, also referred to as adrenalin and noradrenalin, stimulate blood pressure and heart rate to meet the needs of the body during periods of excitement.

Writing in the January 25th issue of the *Journal of the American Medical Association*, Dr. Dimsdale and Dr. Jonathan Moss, an MGH anesthetist, reported on a six-month study of catecholamine responses in 10 young physicians at the MGH. Each wore at the waist a small pump which obtained samples of blood through a tube inserted into a vein.

The authors reported that when these house officers or junior staff members addressed medical groups, an assignment they were not yet accustomed to, their epinephrine levels tripled and their norepinephrine rose by more than 50 percent.

A flood of emotion-activated hormones such as catecholamines can cause cardiac abnormalities.

Studies have shown the development of irregular heartbeats (arrhythmias) in normal people driving in routine traffic. Sudden heart rate changes of more than 30 beats per minute have been noted in patients reacting to the taking of their pulse.

One published study reported dramatic EKG (electrocardiogram) changes in a 69-year-old patient, a survivor of a Nazi concentration camp, as he began recounting experiences that he had had some 25 years before in the camp. The changes were marked by transient decreases in blood flow to the heart.

(Dr. Dimsdale is Editor of a book, *Survivors, Victims, and Perpetrators*, a series of essays on the Nazi holocaust, just published by Hemisphere Publishing Corporation of New York.)

Great stress for one individual may be only a minor irritation for another. The extent of tension depends in large measure on whether a person feels in control of his or her problem or at least is able to understand it.

In studies he conducted of fliers who belonged to the famed Lafayette flying service in World War I, Dr. Thomas P. Hackett, MGH Chief of Psychiatry, found that those who survived dangerous combat had very strong personalities.

They were confident and optimistic, handled disappointments well, and had powerful reasons for wanting to live,

such as loved ones back home.

Coping with stress begins in the earliest days of life. Children rely on parental advice and support to contend with their environment. Such training pays dividends later in life when stresses may become an almost everyday occurrence.

Today's environment, however, finds many children confronted with increased burdens: a soaring divorce rate, more mothers working outside the home, and greater demands to attain higher education, to name a few.

"In the early stages of stress, meeting with groups of peers to discuss mutual problems can often put a child on the right path," said Dr. Dimsdale, an Instructor in Psychiatry at Harvard Medical School. "The realization by a child that his problem is not terribly unusual and that he is not alone, and cut off, can be very reassuring."

Recognizing the upsurge of pressures being felt by children, the MGH Children's Service and Psychiatry Service acted last July to step up the availability of psychiatric care to youngsters on both an inpatient and outpatient basis (*MGH News*, November 1979).

In addition to assistance offered in the hospital by the Departments of Psychiatry and Social Service, the Department of Nursing employs a team of Psychiatric Nurse Clinicians who are skilled in dealing with the stress of illnesses.

The clinicians cover most of the inpatient service, ambulatory care areas, and the emergency room. Special em-

Keeping Tensions On an Even Keel

Efforts to alleviate stress should focus directly on its cause, but some general rules can prove beneficial:

- Talk out problems with trusted friends.
- Set attainable goals that also provide personal satisfaction.
- Take time to relax or to engage in stimulating diversions.
- Don't rush through meals.
- Exercise regularly.
- Program breaks of at least several days in your work schedule so that you will have time for yourself, family, and friends.
- Learn to say no when well-meaning people seek more of your time than you have to offer.
- Don't expect your problems to be solved by alcohol, drugs, smoking, or overeating. They will only create new difficulties.

phasis is given to areas where the nature of the illness accentuates the risk of stress: the burn, rehabilitation, and cardiac care units, for example. The clinicians work with the nursing staff in problem solving, and planning nursing care. They consult with families and the health care team.

According to Anne Platt, RN: "The stress of hospitalization diminishes one's normal coping ability. It is not unusual

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An opportunity to express one's feelings often serves as a safety valve against excessive tension buildup.



Dr. Thomas S. Durant of the MGH on duty in a refugee hospital at Khao I Dang, about 10 miles inside Thailand from the Thai-Cambodian border.

Cambodia: A Land of Unending Strife

To many, events in strife-torn Southeast Asia are yesterday's news. But not to Dr. Thomas S. Durant, Assistant Director of the MGH.

The Chief Public Health Officer in Saigon for the Agency for International Development from 1966 to 1968 is back at the MGH after three months of volunteer medical duty in overcrowded refugee camps along the Thai-Cambodian border.

The conditions being endured by hundreds of thousands of Cambodians (Khmers) are graphically illustrated by Dr. Durant in his account of a day he spent at a camp known as 007 (Nang

Samet). The lighter side that sometimes emerges from the diary reminds us how in the midst of tragedy mankind needs a psychological outlet from the grimness of reality. [EDITOR'S NOTE].

9:00 a.m. As we approach the road that leads to the camp, Thai troops are chasing a couple of hundred Khmers across the field back toward the camp. Someone asks, "Why are so many Khmers leaving the camp?" The answer comes back, "It's a sign. It could be a good sign or a bad sign." The group laughs and drives on.

9:30 a.m. We arrive at the camp. There seems to be less activity than usual, and on arriving at the pediatric bamboo hut we find no patients. I ask the Khmer interpreter, "What is going on? Why are there no patients?" He sits down and scribbles the following note: "Because! In this camp there are some group of bad soldiers. So the good ones in this camp invited the other camp soldiers to make the bad ones falling down."

10:00 a.m. As I finish reading the note, the first rounds of automatic fire begin and increase rapidly and appear to be coming from the northeast section of the camp not very far away.

10:15 a.m. We huddle behind the German bus as small arms fire increases. Lisa Polley, an American nurse with A.R.C. [American Refugee Committee] has brought a 2-year-old, who is convulsing with probable measles encephalitis, and the child's mother to the huddled group behind the bus.

Walter, a German pediatrician from Berlin and SOFORTHILFE [a German emergency relief organization], and Lisa try to suction the baby, and suddenly the gunfire increases and comes closer. Eric, a Dutch general practitioner, runs up and says that the I.C.R.C. [International Committee of the Red Cross] bunker about 200 yards away has a radio. Lisa and Eric and I head for that bunker. The Khmer mother and her baby ran in the opposite direction. Walter and several others head for a bunker that is 50 yards away but has no radio.

10:30 a.m. The bunker I am in is jammed with approximately 80 Khmers—men, women, and children—and 20 Internationals [doctors and nurses] who are Dutch, German, English, Irish, Swedish, Danish, American, Thai, Finnish, and Khmers. The bunker is approximately 20 feet by 30 feet, and 8 feet deep. With all these people crowded in, it is roasting hot . . . has to be the biggest international sauna there is!

11:00 a.m. There is a lull in the firing. People begin to come out of the bunker for some fresh air. A wounded Khmer is brought by two friends, Kate O'Brien [an Irish nurse from Dublin] and John [an Emergency Room nurse from California], and I take him 25 yards away to the surgical tent and dress the bullet wounds of his right arm and left leg. As we finish, the firing increases, and we scurry back to the bunker. Kate says, "Ah sure, isn't this just like Belfast!"

11:30 a.m. Another lull, and Kate gets a Red Cross flag and a bamboo



Protected by Thai troops, hospital personnel at Khao I Dang can concentrate on medical duties without fear of attack.

Stress

(Concluded from Page 5)

for the patient to become depressed, angry, and withdrawn in response to the stress of illness."

Suzanne O'Connor, RN, added that families are usually very helpful in facilitating the patients' adjustment. However, she pointed out, "The relatives are naturally worried and anxious about the difficulties that brought the patient into the hospital. Often they're going through the same emotional turmoil simultaneously with the patient."

A videotape on relaxation techniques has been developed by Jeanine Angell, RN. This tape will be shown on WMGH closed circuit television twice daily. It is hoped that the degree of stress experienced can be lessened by adopting such techniques. ■



Kate O'Brien, a volunteer nurse from Dublin, emerges from an underground shelter at a border refugee camp after unexplained gunfire ends.

pole and plants the flag on top of the bunker. I really feel like I'm in a bad "B" movie with no director and bad central casting!

11:43 a.m. A classic bit of comic relief. A skinny, tuberculous-looking pony trots by the bunker, stops, looks in, and trots off. (I can see John Wayne riding off and out of the camp under gunfire.)

12:00—Trish Sole [a New Zealand I.C.R.C. nurse] is manning the radio. "Alpha 1 to Alpha 6," we hear. "How many personnel are there? What is the status of firing?" Trish (in classic clipped British tones): "There are 22 Internationals and 80 Khmers. We are experiencing sporadic small arms fire and occasional mortars."

It is fiercely hot, and everyone is sweating profusely. Someone quips, "Never have so many sweated so much and urinated so little."

"Alpha 2 to Alpha 1," the radio crackles from another bunker. "We are surrounded by Khmer Rouge [Communist forces] and unable to move." Again there is a lull in the firing, and an impeccably dressed Swiss journalist saunters by the entrance to our bunker, peers in, says "hello," and strolls off, like he was in the Quincy Market [a newly renovated and popular shopping area adjacent to Boston's historic Faneuil Hall].

Just then, the loudest bang of the morning takes place, and the concussion shakes the bunker. Who the hell is shooting what, and at whom? Doubt

that the Khmer Serei [non-Communists] or Khmer Rouge have that caliber mortar. Thai artillery? Vietnamese mortars?

12:15 p.m. "Alpha 1 to Alpha 6: We are coming by to pick you up in five minutes. Do you have any vehicles?" Trish: "Yes. We have transport!" (A Datsun pickup truck in front of the bunker.)

12:20 p.m. An I.C.R.C. pickup truck races up to the bunker. Everyone piles out and into the two pickup trucks. Firing is minimal, and we race to the edge of the camp to join eight other pickup trucks and other I.C.R.C. doctors and nurses. We start to treat several Khmers in a bamboo hut near the edge of the camp.

12:30 p.m. Suddenly the firing increases again and comes closer. Lisa, Kate, and I head for a pickup truck. Lisa does a diving belly flop over the tailgate. (Judges give her a 4.9 on the cards with a 2.6 degree of difficulty). We barrel off to approximately two kilometers from the camp and regroup.

Several wounded arrive and Lisa, John, and a German doctor, and I take three wounded Khmers (leg, abdomen, and shoulder bullet wounds) and one of the wounded's husband and daughter (5 years old) in a pickup truck back to Khao I Dang, 10 miles away. The wounded are silent, the husband stoic, and the daughter cries and vomits. (The German doctor holds her over the tailgate and comforts her.)

1:00 p.m. We arrive at Khao I Dang and bring the wounded to the German Red Cross Surgical Hospital.

2:00 p.m. John, Walter, and I head back to 007. We get to the edge of the

camp and are again driven back by the heavy firing. We drive two kilometers, meet six or seven pickup trucks. Ten to 20 I.C.R.C. doctors and nurses are grouped, all asking what the hell is going on? Who's shooting at whom?

2:30 p.m. Several wounded arrive. Walter, John, and I start IV's [intravenous fluids] and pack eight wounded Khmers into the back of a large Thai diesel truck, and I head back to Khao I Dang with the wounded.

3:15 p.m. A 30-year-old Khmer woman with a bullet wound in the chest dies in her mother's arms on the way back. The others all make it. When we arrive at Khao I Dang, there are 10,000 Khmers gathered around the entrance to the camp, looking to see if their relatives are among the wounded.

4:00 p.m. More wounded and refugees arrive. Everyone asks, "What's happening?" Is it the Vietnamese . . . the Khmer Rouge? Who? The Khmer Serei of 007 vs. the Khmer Serei of Mak Mouen, a border camp six miles away? It becomes a multiple choice quiz.

I'm reminded of the Churchill quote, "In war, *truth* is the first casualty."

6:00 p.m. Approximately 50 wounded have arrived and maybe 2,000 refugees. There is a beautiful violet Thai sunset in this schizophrenic Shangri-la. But there is no ending to this bad "B" movie, and at the end of this episode of an eternal serial, as always, there are no real victors, only the dead, wounded, grieving, and the tired, dirty, confused observers. ■

(Related Story on Page 8)



Hundreds of thousands of Cambodians live in unsupervised camps strung along the Thai-Cambodian frontier. Often the refugees must flee to escape clashes between various militant groups.

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Medical Aid Improves for Cambodians

At the refugee camp known as 007, situated along the Thai-Cambodian border, battle casualties are an almost daily occurrence.

"Hardly a day went by when we did not have to treat people for wounds inflicted by gunfire or mines," said Dr. Thomas S. Durant, Assistant MGH Director, who recently served as a medical volunteer in what he described as "this no-man's land."

Until volunteers such as Dr. Durant, who served under the auspices of the American Refugee Committee, arrived in the border area, medical care was nonexistent for the 500,000 to 750,000 Cambodian refugees occupying a chain of camps strung out along the frontier.

For the most part, the fighting rages between factions of Cambodian militants determined to control the border territory and the distribution of aid to the people there.

So unstable is the situation that when major attacks occur, entire camp popu-

lations disperse, to re-form elsewhere or to seek safety in nearby Cambodian hills.

Aside from the battle wounds he tended, Dr. Durant's major concern at 007, which had 80,000 inhabitants, was treating people for malnutrition, respiratory and gastrointestinal problems, malaria, and, occasionally, meningitis.

Accompanied by medical colleagues from many nations, the MGH physician made daily visits to 007. The health care team also devoted much time to operating a 1,000-bed refugee hospital at Kao I Dang, several miles inside Thailand.

"The medical care there is absolutely superb," said Dr. Durant. "Each relief agency assumed responsibility for running various parts of the hospital."

A gynecologist, Dr. Durant worked in a 100-bed adult medicine ward, supervised by the American Refugee Committee. A German group had

charge of an operating room and two surgical wards accommodating 100 patients each. A French agency ran a pediatric and obstetrical ward. Catholic Relief Services directed an intensive pediatric feeding ward. A team from Cornell University Medical College supervised the hospital's admissions.

The magnitude of Cambodian refugee needs is so great that two of Dr. Durant's sons joined him during his three months in Asia. Joseph Durant, 21, who attends the University of Massachusetts, and 20-year-old Sean, a student at Boston College, paid their own expenses and worked for the United Nations' High Commissioner for Refugees.

The rainy season is under way again in Cambodia, and it is certain to provoke another crisis for the beleaguered population.

"The rice crops are usually planted around this time," said Dr. Durant, "but the Cambodians have no seed to plant, and they have no stores left over from the last crop. So their daily existence depends upon a continuation of massive international aid."

The rainy season, which extends until next December, poses another major problem. Food is delivered over the road to the border camps, and although the roads are paved most of the way, the last few miles of travel are on dirt stretches which become impassable.

One might propose that if the food cannot be moved to the people, the people can be moved to the food. But, Dr. Durant pointed out, "Thailand does not want to be overrun by refugees."

The refugees at the same time do not want to return to their former homes in Cambodia because that would mean living under a government that is Vietnamese-controlled.

"It's a continuing daily struggle for the refugees," Dr. Durant said, "and I can't say that any increase in stability is likely soon along the border." ■

(Related story begins on Page 6)



One of the helpless pawns of Cambodia's political upheaval.



MGH *News*

Vol. 39 No. 5

MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS

June-August, 1980

Meeting the Emergency Medical Needs of Children

Gout Medicine Controls Rare Fever

A Boston advertising executive, plagued for years by attacks of a painful, inflammatory disease, hurried from his downtown office to a nearby pharmacy to pick up a new prescription.

"I walked in just as the pharmacist was about to close the bottle of pills," he recalled. "I told him, 'Hold it. Give me one first.' I popped a pill into my mouth, and I haven't had an attack since. It's been seven years."

The medicine was colchicine, long used to treat gout, an illness marked by severe arthritis. The executive, whom we will call Mr. Sherman, did not have gout but a rare and strange-acting con-

dition known as Familial Mediterranean Fever (F.M.F.).

Patients with F.M.F. suffer periodic episodes of fever which may reach 104°F, accompanied by shaking chills and a painful inflammation of either the membrane encasing the abdominal organs (the peritoneum) or linings of the chest cavity (the pleural membrane). Arthritis may also set in.

Each attack usually lasts about three days but may continue up to a week. Between bouts, the patient may seem in excellent health.

Speaking recently at an MGH medical conference (Arthritis Grand Rounds), Mr. Sherman said his atten-

(Continued on Page 2)

Microsurgery Helps Fight Brain Tumors

A brain tumor which grows in a location once referred to as "the darkest recess of neurosurgery" is slowly yielding to advances in medicine.

Microsurgical techniques coupled with improvements in neuroanesthesia and postoperative care not only have markedly reduced the death toll from acoustic neuromas but also have preserved near-normal function for a large percentage of patients.

Acoustic neuromas are so called because they originate on a nerve that involves hearing. Partial hearing loss which becomes progressively worse constitutes in most cases the first major symptom of the disorder.

A ringing, buzzing, or hissing sound

(Continued on Page 7)



On a very hot day, you can sometimes cook eggs on the hood of a car. (Story on page 5)

"We thought we were going to lose her."

Edward DiLorenzo of Melrose recalled the most frightening day that he and his wife, Nancy, had ever experienced, a day when their daughter, Christine, then 3, nearly lost her life.

The girl had fallen from the top of the stadium bleachers at Melrose High School, plunging head first 50 feet to a pavement behind the seating area.

For five days Christine lay in a coma at the MGH with two fractures of the skull and a bruising of the brain. By the end of 10 days, however, the child not only had regained consciousness but also was ready to go home.

Christine initially was taken to Melrose-Wakefield Hospital, but physicians quickly recognized the severity of her injuries. With doctors and nurses tending her, she was rushed to the MGH where highly specialized care was available.

In the Pediatric Unit of the MGH Emergency Ward (E.W.), steps were taken to guard against any rise in the patient's temperature, any abnormal pressure on her brain, and any threat of seizures.

Meantime, pediatricians in the E.W. received the assistance of pediatric surgeons, neurosurgeons, and radiologists in evaluating the child's condition and starting emergency treatment.

The specialists involved in the diagnosis continued to follow Christine's progress as she later received care in the hospital's Pediatric Intensive Care Unit. She made a speedy recovery.

The Pediatric E.W. had provided a perfect setting for a quick assessment and treatment of Christine's injuries

(Continued on Page 4)



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EDITORIAL:

Coping With the Effects of Inflation

At times like these the relationship between the nation's economic health and the physical well-being of Americans grows increasingly and painfully apparent. Less privileged countries live habitually with this lesson. There, lack of food results in the protruding abdomens of malnutrition. A poorly balanced diet leads to deficiency diseases like beriberi and scurvy. Poor public health control results in fatal forms of diarrhea and malaria.

Even in the best of times the United States has endured pockets of disease that strike the poorly fed and the uneducated. These represent chasms of opportunity in overcrowded cities and underserved rural areas. Since most Americans are traditionally well fed (too well), well clothed, well sheltered, and reasonably well educated, these pockets of disease and discontent tend to receive ritual attention of the "Band-Aid" variety.

Now inflation is gnawing at the middle income population which predominates in our society. As a consequence, a growing concern is permeating a large segment of our country. For most the change at the food table to date means hamburger instead of sirloin. To the extent that we cut back on rich and fatty foods, the enforced new life-style may prove beneficial. Impelled by rising gas prices, people who drive less and walk more should also benefit. For those who become unemployed the danger is that the diet may actually fall into nutritional imbalance. Much wiser management of the dwindling food budget becomes imperative.

Nutrition aside, the economy may foster some other medical problems. Little is proven about the relationship between a deflated purchasing power and our health. There are, however, some indications. The resultant stress seems to provoke mental breakdown in people who already have a tendency in that direction. With the increased mental stress, seemingly related gastrointestinal difficulties, unexplained headaches and other pain, and a variety of real or imagined ills appear to follow.

Citing or even predicting problems is much easier than offering solutions. Obviously the basic resolution lies in the degree of soundness in the government's economic policies, and in the cooperation of the business community and general public with those policies. How long the financial problems will plague the nation remains an unanswerable question. Insofar as education can assist in coping with the medical consequences of stagflation, the *News* will try to help. Last month's issue contained an article dealing with stress. From time to time, we will present other information designed to point the way to better health in trying times.

Rare Fever Thwarts Clear-Cut Diagnosis

(Continued from Page 1)

tion was directed to colchicine by a friend who had read in the *New England Journal of Medicine* about successful MGH trials of the drug among a few F.M.F. patients.

The author of the article was Dr. Stephen E. Goldfinger of the MGH Gastrointestinal Unit who later became Mr. Sherman's physician.

Dr. Goldfinger presented Mr. Sherman at the Grand Rounds because he had an interesting story to tell.

The 56-year-old businessman said that in 1944, while serving with the military in the South Pacific, he contracted what appeared to be malaria. Although tests never confirmed the disease, the symptoms—chills and fever—were present, and he was in so-called "malaria country."

Over the next 10 years, he suffered some 38 attacks, each putting him to bed for four or five days. Then, the spells suddenly halted.

Thirteen years later, in 1967, periods of chills and fever resumed, this time accompanied by excruciating abdominal pains which he had never experienced before. The attacks also were of shorter duration than earlier ones.

Doctors in a Boston hospital held to their tentative finding of possible malaria until 1970 when Mr. Sherman was hospitalized during one of his increasingly frequent spells. Since the pains were inconsistent with signs of malaria, a closer study of the patient's history was carried out, and the diagnosis was changed to probable F.M.F.

The disease occurs predominantly among people of Mediterranean stock, especially Jews of Sephardic (Spanish or Portuguese) origin, Armenians, or Arabs. Mr. Sherman had not previously been considered a likely candidate for F.M.F. because although he is Jewish, his family is of Ashkenazi descent (Jews of Central Europe).

"I was delighted to hear that my medical problem finally had been giv-

Photographs: Pages 1, 5 (upper), 6, courtesy of Boston Herald American; pp. 3, 4, 5 (lower), Myron Daniels; p. 7, courtesy of Dr. Robert G. Ojemann; p. 8, courtesy of Dr. William W. Montgomery.

en a name," he told his MGH listeners. "But when I asked, 'Now what can you give me to cure it?' I was informed, 'We have nothing available.'"

Mr. Sherman endured a total of 77 attacks between 1967 and the time six years later when he began taking colchicine.

Although first described in 1908 at a meeting of the American Association of Physicians, the disorder remains an enigma in 1980.

"There is still no test for F.M.F.," said Dr. Goldfinger, who is also Associate Professor of Medicine at Harvard Medical School and its Associate Dean for Continuing Education.

"To identify F.M.F., we must rely initially on a clinical recognition pattern. A tentative diagnosis can then be reinforced by tests eliminating the possibility of other diseases.

"In addition, since we now know that a great majority of F.M.F. patients respond favorably to colchicine, we can give that drug to someone with symptoms suggestive of the illness. Improvement of the patient would support the presumptive diagnosis of F.M.F."

Prior to the use of colchicine, many treatments for the disease were tried but with limited success, at best. They included various diets, and anti-inflammatory drugs such as cortisone derivatives. Mr. Sherman reported that prednisone, a synthetic form of cortisone, sometimes halted oncoming attacks, but two or three days later they would recur.

The idea of using colchicine against F.M.F. arose from a suspicion that a process known as phagocytosis, which figures in gout, may also be active in F.M.F.

A phagocyte is a form of white cell in the blood. In gout the cell ingests certain crystals (sodium urate), and inflammation results. Colchicine inhibits the process.

Dr. Kurt Bloch, an MGH physician who now directs the Allergy Unit, suggested that these same white blood cells may devour some unidentified material during F.M.F. attacks, causing inflammation, and that colchicine may also help to counter this problem.

Going on that theory, another MGH physician, Dr. Guillermo C. Sanchez, used colchicine to treat a middle-aged man for F.M.F. in 1968. The patient subsequently noted a dramatic reduction in the frequency of his illness.

In 1970 Dr. Goldfinger employed the drug in successfully treating a young woman whose F.M.F. was severe enough to cause a life-threatening depression.

The two patients of Drs. Sanchez and Goldfinger later were included in an 11-patient MGH study of the value of colchicine in treating the unusual malady. Nine of the patients were Jewish. Another was Armenian, and one was Syrian. They ranged in age from 20 to 58.

A review of the history of all 11 led to a conclusion that if the drug had no effect, the patients together would have experienced a total of 355 attacks during the course of the study. As it turned out, only seven attacks were reported. And three of those occurred after patients, on their own, stopped taking the medication.

In 1976 medical researchers in Israel studied long-term treatments with colchicine among 84 F.M.F. patients. Fifty reported an end to their attacks,

and 28 noted a substantial decrease in frequency. Only six patients reported no change.

Despite the vast difference in their population, the United States and Israel each have about 1,000 F.M.F. patients. Among those in the small Jewish state, however, more than half are plagued by the added complication of arthritis, and between 25 and 40 percent also have a condition called amyloidosis.

Amyloid is a fibrous protein which tends to be deposited in various tissues of the body. In F.M.F., the kidney is the organ most involved, and this is why kidney failure is the major fatal complication of the disease.

For some unknown reason, most American F.M.F. patients escape the arthritic effect of the disease, and amyloidosis is virtually nonexistent among them. Also, approximately half of the Jewish patients in this country are of Ashkenazi, rather than Sephardic, descent.

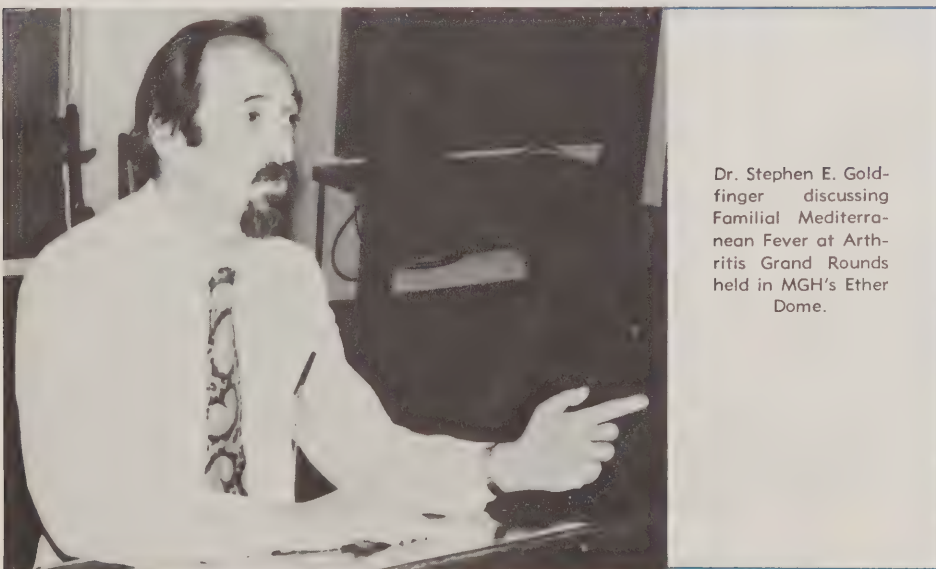
Another strange aspect of the disorder is that remissions seem to occur during pregnancy and in people undergoing hemodialysis (a procedure for removing impurities from blood, usually prescribed because of weakened kidneys). When F.M.F. patients on hemodialysis subsequently receive kidney transplantations, their attacks sometimes resume.

Taken at the height of an attack, colchicine may not produce beneficial results. It seems to stave off spells best when used before symptoms appear. Dr. Goldfinger said the customary treatment to prevent the illness calls for one to three pills daily.

The MGH physician confirmed the long-term effectiveness of this routine not only in the group of 11 F.M.F. patients originally treated with the drug at the MGH but also in his subsequent patients.

For patients who experience only one or two attacks a year and prefer not to take pills every day, physicians at the National Institutes of Health have worked out an alternative. It provides that at the first sign of symptoms the patient should take one colchicine tablet every 90 minutes until six pills have been ingested; then one pill twice a day for the next couple of days.

"This program is not as effective as preventive treatment," Dr. Goldfinger said, "but may lessen the severity of the attacks considerably." ■



Dr. Stephen E. Goldfinger discussing Familial Mediterranean Fever at Arthritis Grand Rounds held in MGH's Ether Dome.

Senior Pediatricians Help in Furnishing Emergency Care

(Continued from Page 1)

because doctors there were only steps away from laboratory, X-ray, and other basic diagnostic facilities.

Dr. Ronald R. Benz, Director of the Pediatric E.W. since 1973, also pointed out that, unlike most hospital emergency treatment centers, his unit is manned during busiest hours of the day by senior staff pediatricians as well as residents.

"We can do this because we're a big hospital," he said. "The staff physicians work with the residents between 9 a.m. and 9 p.m., Monday through Friday, when three-quarters of our patients come in. At other times during the around-the-clock operation, a senior resident is available."

A Technical Assistant also works in the unit during busy hours.

Situated in a separate section of the MGH's general Emergency Ward, the Pediatric Unit has expert and technological backup, including operating rooms, for the severest problems.

Children, badly injured in an accident, for example, would be seen immediately in an E.W. operating room by both pediatricians and surgeons.

Established in 1971 with four treatment rooms, the children's emergency area accommodates daily as many as 40 patients ranging from infants to 18-year-olds. They represent approximate-

Dr. Ronald R. Benz, Director of the Emergency Ward's Pediatric Unit, examines 14-year-old Paul Scapicchio.

ly 18 percent of all patients treated in the E.W. each day.

By having a waiting room and treatment section reserved for pediatric patients, the hospital screens the children and their parents from frequent scenes of severely injured adults arriving in the E.W. following violent incidents.

Dr. Benz said, however, that the principal reason for establishment of his unit was to bring pediatric expertise to bear on pediatric problems.

"We handle a slew of medical emergencies that are unique to children, problems that only people trained in pediatrics would normally encounter," he explained.

His staff might be called upon to treat certain infectious diseases, ingestion of foreign bodies, congenital heart disease, croup, or epiglottitis, an inflammation of the lidlike cartilage which

keeps food from entering the windpipe during swallowing.

"We see whoever comes in the door, whether the condition is major or minor," said Dr. Benz, who is also Instructor in Medicine at Harvard Medical School.

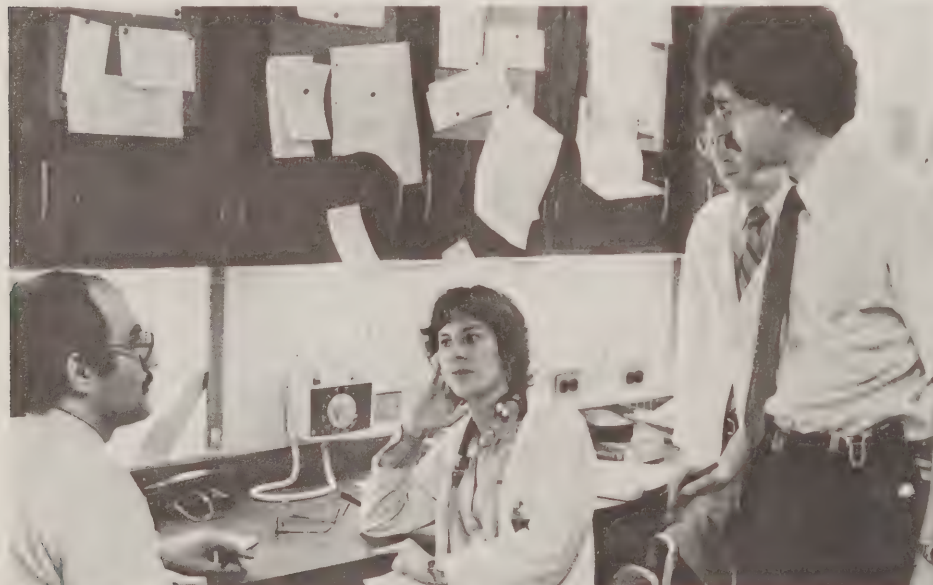
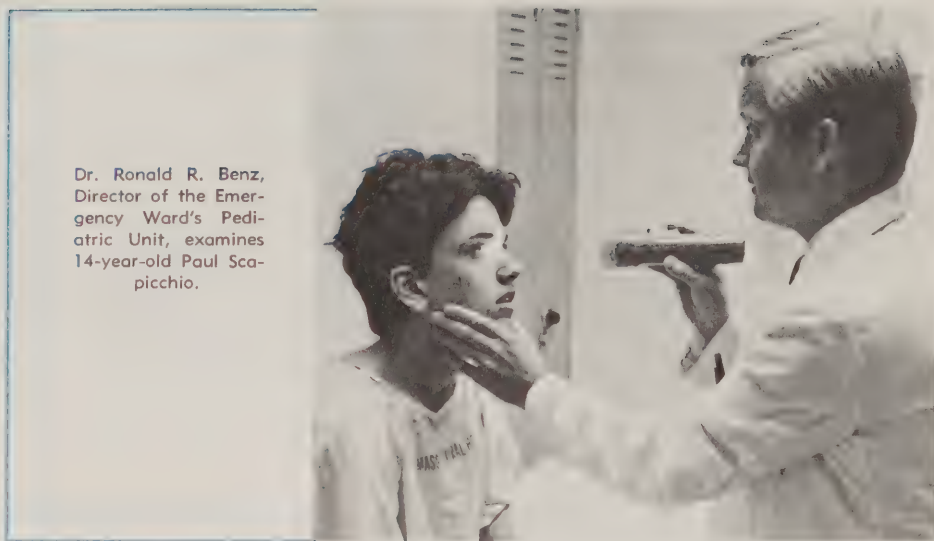
Occasionally, the patients travel long distances. Within the last year or so, young patients have arrived from such faraway places as Spain, the Dominican Republic, the Azores, the Cape Verde Islands, Venezuela, and Brazil.

"Even those who come from overseas are not necessarily destined to be inpatients," the doctor pointed out. "Sometimes a child develops a problem that the parents feel is too complex for treatment locally, so they decide to have the MGH handle it. The child might be treated initially in our E.W. and then receive follow-up care in our Pediatric Outpatient Department."

Fate took an unusual turn during the winter for one child from Valencia, Venezuela. Two days after arriving in Boston to visit relatives, eight-year-old Abraham Aramendi was brought to the Pediatric E.W. for treatment of what his mother thought was a minor ankle injury. Just before leaving home he had fallen from a skateboard.

Certain that the problem was not an ankle injury, the examining physician ordered X rays. They revealed a mass which turned out to be severe bone cancer. The boy's right leg had to be amputated, and he later underwent surgery to remove cancerous tissue that had spread to his lungs. Currently, Abraham is receiving chemotherapy (drug treatment) at the MGH.

On numerous occasions a junior resident in the Pediatric E.W. will accom-



Conferring in the Pediatric Emergency Ward about a patient are (from left) Drs. William Russell and Corinne Ertel, both of the Children's Service; Jon Portis, a Harvard Medical School junior, and Dr. Steven Shapiro, an orthopedic surgeon.

On a Hot Day, It's Best to "Cool It"



Life on earth depends on energy radiating from the sun. Although 93 million miles away, the sun warms us, provides light, helps plants to grow into food, and enables our skin to make Vitamin D, necessary for the body's proper absorption and use of calcium.

But the sun's energy can become overabundant and be harmful to life. Summer, when outdoor activity peaks, brings the greatest peril.

In areas of seasonal weather changes, who has not on occasion felt "drained" during a hot spell and thereupon ceased all activity to rest.

Such prudence pays off in continued well-being. *Those who ignore oppressively high temperatures and humidity and persist in exercising themselves without adequate safeguards risk a variety of disorders, even death.*

The body responds to excessive heat in two ways: by sweating and by dilating blood vessels in the skin.

Evaporation of the sweat helps to cool the body. Meantime, expansion of the skin vessels enables more blood to reach the body's surface and radiate surplus heat to the outside world.

If enough fluid is present to permit sweating, the body can tolerate much

heat. But when heavy perspiration consumes too much water and salt, the condition, further aggravated by the diversion of blood from vital organs to the skin, may lead to dizziness and fainting.

After the Boston Marathon on April 21, ambulances transported 23 runners from the finish line to the MGH's Emergency Ward (E.W.) for treatment of heat exhaustion.

"The weather was warm that day, but not extraordinarily so," commented Dr. Peter L. Gross, Associate Chief of Emergency Services. "Yet, all of the runners brought in were weak. Some had fainted or suffered nausea. Half had been stricken with severe muscular cramps in their legs in addition to general exhaustion."

Cessation of their exercise coupled with a taking of cool liquids and a few hours of rest in the E.W. restored the runners to their former vigor. They were released as soon as their mildly elevated temperatures (100° to 101°F) returned to normal.

Dr. Gross said it is not unusual to encounter a spate of patients suffering heat-related illnesses at the start of a warm season because it often takes

(Continued on Page 6)

pany an ambulance to pick up an ill or injured youngster. If after evaluation and initial treatment in the emergency unit the child needs to be held for a brief period of observation, he might be given a bed in the general E.W.'s Overnight Ward or sent to a children's inpatient ward.

Newborns present the highest risk during ambulance transport. Upon arrival the baby may be taken directly to the MGH's Newborn Intensive Care Unit or require stabilization or tests first in the emergency area.

A baby suffering from epiglottitis, for instance, might be held in the E.W. pending operative care.

Because of the perils in moving an ill newborn, the MGH nine years ago became the first hospital in New England to organize a formal, emergency transfer system for such infants.

Many children come to the Pediatric E.W. with complaints that are minor medically but major in the eyes of the parents. The house officers are especially trained to be sensitive to parental feelings even though technically their duties are to give emergency care.

A child might have had a rash for what seemed like an inordinately long time, and the parents might have decided at some odd hour, "Enough's enough. This has to be looked at."

Instead of advising the parents to take their youngster to the family doctor, the resident in the E.W. will provide initial treatment for the minor

rash and then offer reassurance that things are not as bad as they seem.

"It's amazing, however, the number of people we meet who don't have family physicians," Dr. Benz commented. "This lack of association used to result

in many repeat visits to our unit.

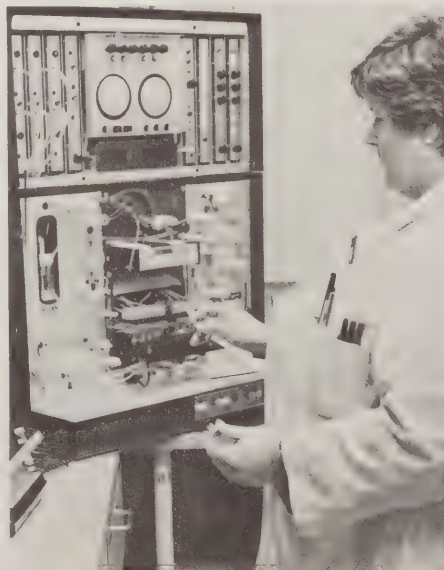
"Now, if a family lacks a personal physician, we can usually persuade one of our own people to take over that role and provide continuity of care."

Staff pediatricians participating in group practice at the hospital or working in MGH neighborhood health centers often become the child's physician.

The Pediatric E.W. offers indispensable experience to young doctors who have elected to specialize in the treatment of children. During the three years of training given to residents in the MGH Children's Service, each house officer finds himself rotated periodically to duty in the E.W.

If he encounters a condition with which he is unfamiliar, such as a disorder common to a foreign country, like Nigeria or Afghanistan, the doctor knows that he has at his disposal the full resources of the hospital.

"A great advantage of working and studying in a place like the MGH," Dr. Benz remarked, "is that no matter what the problem, you can be pretty certain that somewhere in the hospital there's an expert on the subject." ■



With an automated counter, Mrs. Rosemary Jaromin, Supervisor of the Emergency Ward's Hematology Laboratory, is able to conduct seven blood tests. The laboratory offers service around the clock.

Heat Stroke: A Medical Emergency

(Continued from Page 5)

time for people to become acclimated to weather changes.

Treatment for sunburn, heat-induced muscle cramps, or heat exhaustion rarely requires admission to the hospital. There is a fourth heat-related illness, however, which, unlike the others, causes anxiety.

"We don't see many cases of heat stroke," said Dr. Gross. "Fortunately, it affects only about 3,000 people a year in this country. Heat stroke is a catastrophic medical condition."

It is marked by an altered mental state, usually loss of consciousness; a body temperature of 106°F or higher, and, often, an absence of sweating. The death toll can reach 70 percent.

The term stroke refers to the frequent suddenness of the attack. While running, a person may without any warning lose consciousness. At other times, the illness may develop over hours.

"Heat stroke calls for a very rapid lowering of the body's temperature," Dr. Gross declared. "In the E.W., we

first make certain that the patient is breathing adequately. Intravenous fluids are given, and then the patient is placed in a tub of ice. His rectal temperature is monitored continuously until it comes down to 100° or 101°."

Physicians next will determine what adverse effects, if any, the patient's blood and vital organs endured. In addition to damaging blood, heat stroke can injure the liver, cause kidneys to stop functioning, and even precipitate a heart attack.

Once the diagnosis is complete and treatment has begun, the patient can be moved to an intensive care unit. The length of hospitalization depends on the extent of complications.

Overexertion and overexposure to the sun are not the sole causes of heat stroke. *People who wear multiple layers of clothing despite the heat, who confine themselves to hot, stuffy apartments, or who, because of some physical infirmity, cannot control their body temperature also may be stricken.*

In addition, workers whose jobs entail a hot environment, such as a smelt-

ing plant, risk heat-related illness. Few instances of heat prostration or stroke occur among such workers, however, since most are careful to acclimatize themselves to their occupational setting.

For someone engaged in heavy exertion who cannot adjust to very hot, humid weather, salt tablets may help. *Generally, however, Dr. Gross said that so long as they keep themselves hydrated with liquids people in reasonably good health do not need salt pills while exercising in a hot environment.*

One must also bear in mind that people with certain ailments, such as hypertension, should avoid salt.

During a hot spell, lightheadedness, dizziness, or a sudden headachy sensation sometimes precedes impending heat prostration or the more serious illness of heat stroke. Even when a person falls unconscious without warning, a layman often can perceive signs that heat may be responsible.

"If the collapse occurs on an oppressive day while the person is running in a race or standing on a sun-baked parade ground, it is reasonable to assume that he was overcome by the heat," said Dr. Gross, who is also an Instructor in Medicine at Harvard Medical School.

Effects of the Sun Can Be Deceiving

Tanning has long been a summer vogue connoting robust health. For some people, a tan comes easily. For others, the fair-skinned, the effort often leads only to painful sunburn.

With a better understanding of how sunburn occurs and what protective steps can be taken, most people need not pass up the pleasures of basking in the sun.

In his book, *Dermatology and Skin Care*, published by McGraw-Hill, Dr. John A. Parrish, an MGH dermatologist, points out that the warmth we feel while in the sun is caused by infrared radiation. Sunburn, on the other hand, stems from overexposure to middle-wave ultraviolet light (UV-B).

On a hazy or cloudy day, for example, people sometimes prolong their stay on a beach because less infrared radiation reaches the earth and the skin feels cooler. The air's moisture does not also filter out the UV-B, however, so the consequence can be a

severe sunburn.

Sunscreen lotions and creams, particularly those containing para-aminobenzoic acid (PABA), provide effective protection against unwanted sun exposure.

Dr. Parrish advises people to apply sunscreens to all exposed areas of skin at least 20 minutes before going into the sunlight, and again after swimming or vigorous exercising.

Sunglasses with a plastic nose guard

attached offer additional valuable benefits.

The doctor cautions against reliance on beach umbrellas or wide-brimmed hats as sun protectors since much sunlight manages to reflect onto the face and body from surfaces around us. ■



Do not underestimate the power of the sun's rays.

Acoustic Tumor Poses Surgical Challenge

(Continued from Page 1)

in the head (tinnitus) and loss of ability to discriminate speech may accompany the hearing disturbance.

As the tumor enlarges, it may then encroach upon other cranial nerves or the nearby stem of the brain, causing facial paralysis, numbness, double vision, and problems with balance and coordination.

If the growth becomes quite large (some reach up to two inches in diameter), even more serious impairment of function may occur.

Acoustic neuromas are found most often at a point in the brain where the inner ear canal leads into an area known as the "posterior fossa." If one were to put his open hand across the lower back of his head, the hand would be over the posterior fossa.

"The individual should be moved at once to a cool area and medical help should be summoned."

If the fainting resulted from heat prostration, the victim is usually sweating profusely. He will quickly awaken, and his temperature will usually be normal, or slightly elevated. Persistent coma, very high fever, and absence of sweating combine to mean heat stroke.

Dr. Gross emphasized that this diagnosis is sometimes correct even if sweating continues. "Heat stroke may follow some adverse effect upon an area of the brain which regulates body temperature," he pointed out. "Or heart or blood vessel responses to the heat may trigger the attack. The exact mechanism is not completely known."

Nothing is more wholesome than outdoor exercise provided proper safeguards are taken. And in no sport are precautions more important than in jogging, the newest national pastime.

"In the summer when the temperature is extreme, joggers should confine their running to the early morning or the evening, the coolest times of the day," Dr. Gross advised. "And they should periodically replenish their body fluids."

"Joggers and everyone else should bear in mind that all heat-related illnesses are preventable. How well you control your own body will determine how well you'll be." ■

Representing about eight percent of all intracranial tumors, the neuroma, because of its location, challenges the skill of neurosurgeons.

"Before patients undergo removal of the tumor, they are advised that they may lose all hearing in the involved ear," said Dr. Robert G. Ojemann, an MGH neurosurgeon who has gained an international reputation for his work on acoustic neuromas.

He added, however, that as a result of increasingly sophisticated microsurgical procedures and instruments "if the patient's hearing at the time of the operation is still reasonably good, there is sometimes a chance—less than 50 percent—that his hearing can be saved."

Of those patients whose hearing is preserved, a few can even report hearing improvement.

The advent of microsurgery has revolutionized the treatment of these neuromas which, although benign, would lead to severe disablement or death without surgical intervention.

Of those medical centers which treat the tumors, only a few have gained wide experience with the disease. The few include the MGH, which removes about 30 acoustic neuromas each year. Many major centers treat only two or three such patients annually.

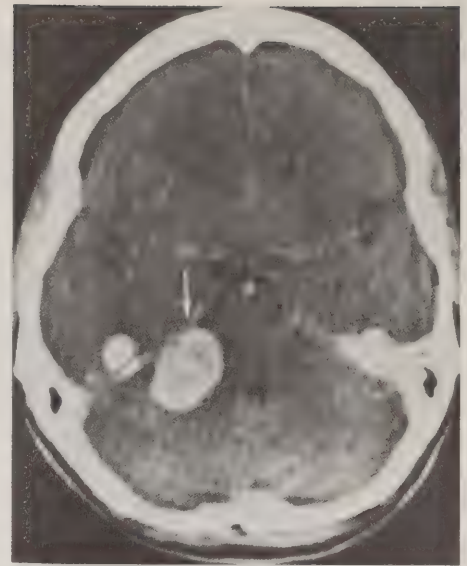
In recent medical lectures Dr. Ojemann cited the results of 156 consecutive MGH microsurgical operations for removal of the growths. Most of the operations were performed during the last four or five years.

Of the 156 patients—114 of whom had large tumors—good results were reported for 138 or 88 percent, meaning they were able to resume full activity. Of the other patients, 11 returned to most of their previous activity with mild impairment, five had significant residual disability, and two patients died.

In an interview, Dr. Ojemann told of a young mother who not only suffered permanent hearing loss in one ear from a neuroma but also developed problems with balance. Her greatest fear was that she might drop her infant.

Removal of the tumor corrected the balance. The mother, in her late 20s, resumed a nearly normal life, free of further fears that the child might not be safe in her arms.

In another situation, a teen-aged



Arrow points to large acoustic neuroma clearly outlined in a computed tomography brain scan.

boy lost hearing in one ear because of a large tumor which was subsequently removed. Within two years, he returned to the MGH to report trouble detecting sounds with his other ear.

Dr. Ojemann found another acoustic neuroma, but it was small. With the newest surgical techniques he and Dr. William W. Montgomery, a senior surgeon at neighboring Massachusetts Eye and Ear Infirmary, were able to eliminate the growth and retain the hearing. Early reporting of the new tumor and prompt surgery had a dramatic impact on the boy's future.

In general, the earlier the tumor is detected, the better the outlook. Since initial symptoms of an acoustic neuroma vary, however, many people fail to heed physical changes that are at first subtle and mild.

"The majority of patients we see have tumors that have reached moderate or large proportions," said Dr. Ojemann, who is also a Professor of Surgery at Harvard Medical School.

He emphasized that care of these patients constitutes a team effort. In addition to Dr. Montgomery, who is a Professor of Otolaryngology at Harvard Medical School, team members include Drs. Stephen W. Parker and Alfred D. Weiss, MGH otoneurologists; and Drs. Pennathur Sundaram, Frederic M. DeBros, Robert N. Concannon, and Sean K. Kennedy, all MGH anesthesiologists.

If presence of a tumor is suspected, X rays are first taken of the "petrous

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Microsurgery Eases Tumor Removal

(Concluded from page 7)

bone," which surrounds the internal auditory canal, to determine if the bone is eroded. A computed tomography (CT) scan, with contrast enhancement, is conducted next.

The CT scan will display almost every neuroma larger than 1.5 centimeters (6/10ths of an inch). Until this painless test was developed, patients had to undergo somewhat uncomfortable, time-consuming diagnostic procedures.

To disclose an acoustic neuroma smaller than 1.5 centimeters, physicians usually perform a special X-ray contrast test called a posterior fossa encephalogram.

A procedure used in diagnosing multiple sclerosis may one day prove to be an important tool in discovering small neuromas. Encouraging reports already have been given on early detection of neuromas with the painless test called

the Brainstem Auditory Evoked Response.

The most common problem arising from surgery to extract an acoustic neuroma is facial paralysis because the facial nerve is situated close to the auditory nerve.

"At one time a large tumor always led to some facial paralysis," said Dr. Ojemann. "Now with the microsurgical techniques, we can save 60 to 70 percent of patients in advanced stages of the disease from having any facial numbness.

"Among patients whose disorder is detected early, 90 percent will enjoy good facial function after the operation."

When the tumor is situated within the petrous bone, Dr. Montgomery's surgical skills become particularly important, especially if there is a chance of preserving hearing.

On other occasions, instead of Dr. Ojemann removing the neuroma

through the lower back of the head, Dr. Montgomery may extract the tumor through the mastoid region behind the ear.

Acoustic neuromas were first described more than 200 years ago, but it was not until the beginning of this century that they were recognized as surgically treatable.

Even then, efforts to remove the growths resulted in a very high mortality rate. One of America's great brain surgeons, Dr. Harvey W. Cushing, led the way toward lowering the operative mortality rate to 11 percent.

Instead of cutting away the entire tumor, Dr. Cushing suggested a partial removal. He reasoned that the dangerous pressure exerted by the tumor could be eased by withdrawing only its contents. The tumor's capsule could continue to rest against brain structures.

Although the surgery provided immediate relief, it soon became apparent, however, that the tumor growth frequently recurred.

American surgeon Walter Dandy subsequently established the basis for the current operative approach, which leads to total removal. From 1925 until the early 1960s, other neurosurgeons modified and improved his technique, shrinking the death rate further.

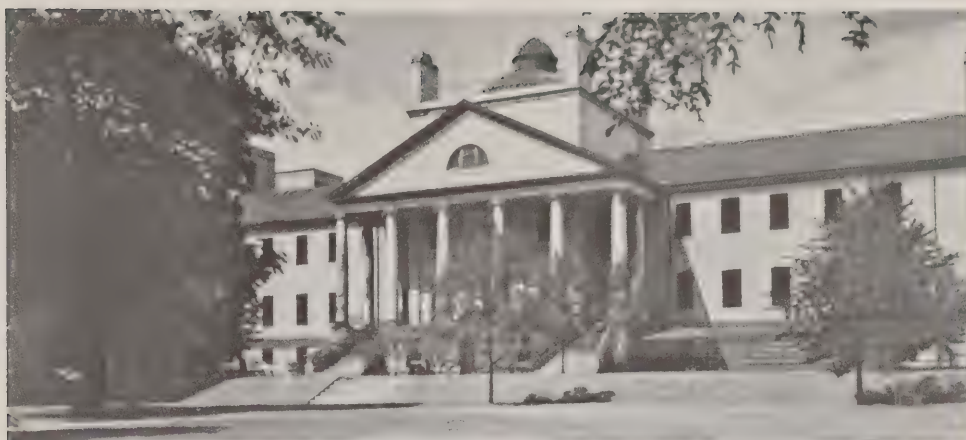
Advances then came fast both in the diagnosis and treatment of acoustic neuromas. A variety of new tests for the detection of small tumors were developed, and the use of magnification, first with a lens called a loupe and later with the microscope, opened a new era in surgery. Introduction of the CT scan came in the early 1970s.

For some elderly patients with advanced tumors, partial removal of the neuroma is still the treatment of choice.

"Decompression may be the only procedure required to relieve their symptoms," Dr. Ojemann declared. "Regrowth of tumors in the elderly could take years." ■



Drs. Robert G. Ojemann (left) of the MGH and William W. Montgomery of the Massachusetts Eye and Ear Infirmary employ a microsurgical technique to remove an acoustic neuroma. At right is Operating Room Technician Earl Jackson.



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September, 1980

Pea-Sized Glands Exert Major Influence on Health

Even a Strong Heart Can Sound Offbeat

The doctor pressed a stethoscope to the chest of the nervous 18-year-old patient and listened carefully to the young man's heartbeat.

What the physician heard was not the rhythmic *lub . . . dub* of a perfectly normal heart, but a *lub . . . click . . . swish . . . dub*.

Turning to the patient's mother standing nearby, the doctor asked if he could also listen to her heart. Again, *lub . . . click . . . swish . . . dub*.

Under questioning, the 50-year-old mother said her general health had always been good. She had certainly never suspected anything irregular about her heart.

"Not surprising," the doctor said reassuringly. "There may be as many as 33-million Americans walking around with mitral valve prolapse. Millions don't even know they have it. Nineteen out of twenty lead perfectly normal lives."

Less than 20 years ago, the sounds such as those detected by Dr. Adolph M. Hutter, Jr., frequently raised suspicions of a whole array of disorders, ranging from rheumatic fever to defects in the walls of the heart's pumping chambers.

Today, when Dr. Hutter hears the classical click followed by a murmur (a swishing sound like water flowing through a pipe) he can easily diagnose the condition.

"I hesitate to call it an abnormality," said the MGH cardiologist, who is Associate Director of the hospital's Phillips House Coronary Care Unit. "I prefer to describe it as a subtle varia-

tion in the way our connective tissue is made up."

Dr. Hutter said that this variation affects an estimated 10 to 15 percent of the American population and tends to run in families.

The inheritance factor explains why the doctor often will examine a parent of a young patient found to have the condition. "What better way to reassure a youngster that it is a benign phenomenon," he suggested, "than to point to a parent who also has the prolapse but has never been adversely affected."

(Continued on Page 4)



(Story on page 6)

(First of two articles)

The human body contains virtually every mineral found in nature, but none is needed in greater abundance to promote good health than calcium.

The average adult has about three pounds of calcium. Paradoxically, the release of this vital element as needed from its storehouse in the bones to support a host of bodily functions rests with four glands, each no larger than a baby pea!

The size of the glands, called the parathyroids because of their location next to thyroid tissue in the neck, sometimes challenges surgeons trying to find the tiny globules.

Medical literature also has recorded more than a few patients with a parathyroid problem who, upon surgery, turned out to have four perfectly healthy glands. The difficulty in most instances arose from a rare fifth gland detected between the lungs in a region called the mediastinum.

For more than half a century MGH investigators have striven to bolster man's knowledge about the parathyroid glands and thus open the door to better modes of diagnosing, treating, and curing disturbances involving the glands. The list of contributions made over the years by MGH-Harvard Medical School scientists is long and impressive.

The body needs calcium for sound bones and teeth, the proper clotting of blood, the normal functioning of the heart, muscles, and nervous system, and the regulation of stomach acidity.

When the glandular machinery for producing calcium-related parathyroid hormone (PTH) breaks down, a run-

(Continued on Page 2)



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EDITORIAL:

To Tell Or Not to Tell

Perhaps since Imhotep examined his first patient nearly 5,000 years ago, doctors have worried about how much to tell the sick. Clearly some people magnify a harmless cough into a sign of lung cancer. Such individuals will often stress themselves for months or even a lifetime after receiving news of having an inconsequential irregularity. Others will take even a serious diagnosis in stride.

A generation ago doctors tended to withhold certain information from worriers and even to hold back some aspects of diagnosis from less easily troubled patients. In recent years the pendulum has swung toward increased candor. This openness arises from a variety of factors. For one, people are generally better educated. There are many more people schooled in the sciences, many more lay articles on medicine, and more television programs which at least impart some medical vocabulary and basic information.

The consumer movement has made patients more aggressive about seeking the facts from physicians. In turn doctors often by providing detailed accounts anticipate this desire for more self-knowledge. A more subtle influence may be the malpractice suits erupting these days with the onslaught of the sue-someone syndrome. Since patients now sue for failure to learn even minor facts about their care, doctors may be more inclined to tell all. Even with the most tactful and clear explanations, however, some people might be better off without every last scrap of information.

The dilemma becomes more and more pronounced in dealing with a problem that may not be a problem. This issue of the *MGH News* describes mitral valve prolapse, a condition that only comparatively recently acquired a name. Many millions of Americans do not even know they have this prolapse. In most instances they have failed to notice symptoms or have ignored them as normal. At this point, cardiologists believe most patients will live out their allotted lives without being in any way handicapped. Under such circumstances ignorance rather than knowledge may produce bliss.

Nonetheless, even a condition as apparently harmless for most people as mitral valve prolapse may well require an informed patient. As the article points out, the condition carries with it a somewhat heightened risk of valve infection. But the cardiologist can reduce the risk by advising the patient to seek antibiotics before certain dental or urinary tract procedures. In some instances knowledge rather than ignorance may produce bliss.

MGHers Played Pioneering Role In Gland Study

(Continued from Page 1)

away hormonal output frequently results. The consequences understandably can be major.

Overproduction of PTH, a condition called hyperparathyroidism, not only can cause thinning of bones, making them easily susceptible to fracture, but can also cause kidney stones, stomach ulcers, and muscular weaknesses.

Bones may be robbed of calcium for years before the fact comes to light. As much as one-third of the normal content of calcium may be released from an adult's bones before the loss shows up on an X ray.

Hyperparathyroidism is one of the commonest glandular disorders. The affliction is said to affect one to two persons in every 1,000 each year. The diagnosis is not always easy to make. An elevated level of calcium in the blood is an important clue. But the standards by which one hospital judges normal blood calcium levels in a patient may differ from criteria followed by another center.

In addition, studies have consistently indicated that about half of all patients with hyperparathyroidism lacked symptoms; the discovery of their illness came only as a consequence of treatment for some other problem.

An elevated level of blood calcium could be caused by a number of other diseases, such as breast cancer and other cancer invading bone.

To sharpen the diagnosis of hyperparathyroidism and to improve treatment, now largely the domain of the surgeon, researchers in the Endocrine Unit of the MGH Department of Medicine are working in several directions.

Using pure PTH, now in increased supply because of the ability to manufacture (synthesize) it in the laboratory, one group of MGH scientists is striving to increase the sensitivity of an extremely useful diagnostic test called radioimmunoassay.

Photography: Page 1, John Canny; pp. 3, 4, 6 (upper), Myron Daniels; p. 5, courtesy of Dr. Peter C. Block; pp. 6 (lower), 7, 8, courtesy of American Lung Association.



Dr. Henry T. Keutmann (seated) of the MGH Endocrine Unit, and Geoff N. Hendy, Ph.D., of Middlesex Hospital in London, examine the results of studies on the structure of human parathyroid hormone.

Another group is working to isolate and analyze the many factors in the process which lead to the natural production of the hormone.

Just as a mechanic dismantles a balky automobile engine to identify malfunctioning parts, so are the scientists looking as far back as genes, the basic units of heredity, for some misstep in the hormone-making assembly line.

None of this work would be possible if MGH scientists had not first identified the chemical structure of PTH.

Of 84 amino acids or building blocks of protein which make up the hormone, the order of the first 34 units, the part responsible for the actions of the hormone, was identified in 1970 by an MGH team led by Dr. John T. Potts, Jr., Chief of the Endocrine Unit.

The team members included Dr. Henry T. Keutmann and two Australian scientists working at the MGH, Drs. Hugh D. Niall and Geoffrey W. Tregear. They collaborated throughout the project with Dr. Gerald D. Aurbach, head of the Section on Mineral Metabolism at the National Institute of Arthritis and Metabolic Diseases where the work began before the team moved to the MGH.

Working independently, a group at the National Heart Institute led by Dr. H. Bryan Brewer, Jr., also worked out the key part of the chain at about the same time. Dr. Tregear led the MGH team in the first chemical synthesis of the active part of the hormone.

The MGH investigators determined the complete structure of the hormone

from the tissue of cows and pigs. Work with the human hormone proceeded more slowly as glands removed at surgery were carefully accumulated over many years from hospitals in this country and abroad.

Early last year, identification of the human hormone's complete structure was announced by Drs. Keutmann and Potts; Mary Sauer, an MGH research assistant; and two colleagues from Middlesex Hospital in London, Geoff N. Hendy, Ph.D., and Dr. Jeffrey L. H. O'Riordan.

"We have found that in addition to the active portion in the chain, other regions in it are also very important for improving our radioimmunoassays," said Dr. Keutmann.

To conduct such a diagnostic test, laboratory technicians prepare an antibody to the hormone and a radioactive tracer quantity of the hormone which attaches to the antibody. These are then combined with a sample of blood from a patient suspected of having hyperparathyroidism. The antibody-tracer complex will seek out PTH in the blood sample and reflect the hormone levels that are present.

Dr. Keutmann estimated that since radioimmunoassays for PTH were first devised in the mid-1960s the tests have made it possible to diagnose eight to ten times the number of hyperparathyroid patients than were diagnosed previously.

More sensitive radioimmunoassays could assist surgeons immeasurably in locating parathyroid glands stricken by disease, most often a tumor.

Already at the MGH, using a special tube called a catheter, doctors obtain blood samples from major veins in a patient's neck and chest. A high PTH concentration in any sample indicates that the source of the disease is near where the blood was drawn.

As efforts to improve diagnostic testing continue, Drs. Henry M. Kronenberg of the Endocrine Unit and Joel F. Habener, Chief of the MGH Laboratory of Molecular Endocrinology, are directing studies to answer some basic questions: "How is PTH made in the parathyroid gland?" "How does the body's calcium instruct the gland to secrete more or less hormone?"

Miss Barbara McDevitt, associated with Dr. Kronenberg, has isolated the human PTH gene, thus clearing the way for investigation of its chemical (DNA or deoxyribonucleic acid) makeup.

Meantime, Drs. Kronenberg and Potts are collaborating with Dr. Habener's team and Dr. Alexander Rich's laboratory at Massachusetts Institute of Technology in a study of RNA (ribonucleic acid), the so-called messenger material which carries the DNA blueprint of the hormone from the gene to the cell machinery.

"Researchers have always looked at the activity of the hormone, or protein, rather than at how the gene works," said Dr. Kronenberg. "But now we have sufficiently sophisticated tools to inquire how the genes direct the synthesis of the hormone in both normal and abnormal glands."

Dr. Habener said that although it is conceivable that these genes may contain structural abnormalities, "it is more likely that the cause of hyperparathyroidism lies in genes which regulate, rather than make, the PTH."

Dr. Gerhard Heinrich of Dr. Habener's laboratory is a key investigator in the project to learn exactly how calcium signals the parathyroid gland to start or stop making hormone.

How PTH breaks down after its usefulness in the body ends also needs answering. These studies are being directed by Dr. Gino Segre of the Endocrine Unit team. The liver and kidneys fragmentize the hormone, and the body then excretes portions. The remainder enters the blood stream.

Some investigators wonder whether the fragmentation makes the PTH inactive or actually is essential to the action of the hormone.

(Concluded on Page 4)



Samples of cloned DNA (deoxyribonucleic acid) are screened in the Laboratory of Molecular Endocrinology by Phillip Dee, research assistant, to find those matching a portion of the parathyroid molecule under study.



To demonstrate the use of echocardiography, Dr. David Steinhaus, an MGH Fellow in Cardiology, undergoes a test administered by Mrs. Harriet Walker, head technician in the Cardiac Ultrasound Laboratory. Doctor's heart action can be viewed on equipment screen.

Echocardiography Helps to Assess Valve Condition

(Continued from Page 1)

What exactly is mitral valve prolapse? The mitral valve allows blood, newly supplied with oxygen, to flow from the heart's left atrium, or reservoir, down into the organ's left ventricle, or pumping chamber. The ventricle then moves the blood through another valve (aortic) into the body's main artery to circulate through the human system.

Normally, an open mitral valve would close in essentially a flat plane. But when it contains excessive tissue, the two-leaflet valve will tend to prolapse, or bend back, into the atrium.

As the billowing back stops, the

Understanding the Parathyroid Glands

(Concluded from Page 3)

Another study seeks to explain why some nonparathyroid tumors, such as growths in the lungs or intestinal tract, are sometimes accompanied by high calcium levels closely mimicking hyperparathyroidism. "These patients seem to have all the earmarks of a very unusual regulation of PTH genes," Dr. Kronenberg commented.

Five years ago, Drs. Habener, Byron Kemper, Potts, and Rich discovered that the parathyroid gland secreted not only PTH but also a second substance

which they named *parathyroid secretory protein (PSP)*. Almost ten times the size of the PTH molecule, PSP raises hopes that it might serve as an even better marker of parathyroid glandular activity than PTH.

Work on PSP is slowgoing, however. Human PSP has not yet been isolated and purified. Moreover, researchers still have not determined whether the hormone serves any physiologic function.

"The parathyroid gland, however, makes as much PSP as it does PTH," Dr. Habener declared. "Therefore, we

believe that the secretory protein must have a role in some biological system. Otherwise, why would a gland devote so much of its energy to produce the substance?"

On several fronts, studies of the parathyroid glands go on, feeding a body of knowledge that has been growing at the MGH since 1926.

It was in that year that research on lead poisoning and calcium metabolism by Drs. Joseph C. Aub and Walter Bauer led to the discovery of hyperparathyroidism (*MGH News*, November 1972). In 1927, Dr. Fuller Albright joined the team and eventually emerged as the principal elaborator.

Although doctors in Europe came upon hyperparathyroidism at about the same time as those at the MGH, wider recognition and understanding of the disease resulted from the work performed here, and from the sacrifices of Captain Charles E. Martell.

In May 1926, Martell, a 30-year-old merchant mariner, became the first patient in the country to undergo hyperparathyroid surgery. The one-time six-footer, who had shrunk seven inches because of his disease, endured a total of seven operations before his tumor was found in a location still regarded as rare.

In a report on the patient, doctors wrote that "he was anxious to be helped, but a large part of his interest lay in what help his case could be to others."

(To be continued)



Dr. Gerhard Heinrich, an MGH molecular endocrinologist, prepares a segment of DNA material to serve as a probe for measuring messenger RNA (ribonucleic acid) levels in parathyroid glands.

valve tenses, often producing that little click heard in the stethoscope. During the tension one leaflet might also part slightly from the other, causing a tiny leak and thus the murmur.

"The leak doesn't mean anything for the patient," Dr. Hutter declared. "It's a very common phenomenon. People with it walk around without any problems whatsoever."

Interestingly, while examining the same patient at different times, a physician may hear only the click, or only the murmur, or both the click and the murmur, or nothing.

Inconsistency of the response confounded medical practitioners until the mid-1960s when X-ray studies of the blood (angiography) helped to explain the true nature of the sounds.

Additional pieces of the puzzle fell into place in the early 1970s with the application of echocardiography, a medical descendant of the underwater detection system known as sonar.

Directed through the chest wall, ultrahigh frequency sound waves are bounced off specific portions of the heart. The echoes can provide a tracing on paper of the heart's action or a two-dimensional image of the heart in motion.

Dr. Arthur E. Weyman, Director of the MGH's Noninvasive Diagnostic Laboratory, said information furnished by the echocardiogram complements what the physician can learn in his examining room.

"Echocardiography provides a painless way of inspecting the anatomy of the heart," he said. "If a physician suspects mitral valve prolapse but needs more confirming data, the echocardiogram can offer a dynamic view of the valve's leaflets."

Of some 75 echocardiogram tests performed in Dr. Weyman's laboratory each week, about 25 percent are for this condition. The echocardiogram can be used diagnostically for a majority of congenital heart disturbances.

Dr. Weyman joined the MGH recently after serving in the Echocardiographic Laboratories of Indiana University Hospital in Indianapolis. The Director of the Laboratories, Dr. Harvey Feigenbaum, is one of the pioneers of echocardiography in the United States.

While mitral valve prolapse most often comes to light as the consequence of a general, routine physical examination, the diagnosis in some instances

follows patient complaints of palpitations or chest pains, or both.

Dr. Hutter attributed the palpitations to irregular heartbeats (arrhythmias) which can be caused by the prolapse. He said the arrhythmias are usually harmless.

As for the chest pains, they often originate, not in the heart, but in the chest wall. "In some patients," the doctor said, "mitral valve prolapse may be accompanied by subtle anatomical variations in the chest wall which produce tenderness in the joints."

Before physicians recognized mitral valve prolapse as a specific medical entity, people who had it and developed palpitations and chest pains frequently became neurotic. Their anxiety over their health led, in turn, to other sensations of illness such as labored breathing and extreme fatigue.

"That doesn't happen very often nowadays because the physician who sees the patient will quickly recognize the prolapse, order any tests that may be appropriate, and then reassure the individual," explained Dr. Hutter, who with Dr. Weyman is an Associate Professor of Medicine at Harvard Medical School.

If the patient has palpitations due to arrhythmias, the physician may call for a 24-hour electrocardiogram, recording the electrical activity of the heart, to make sure the changes in rhythm are harmless. If they do pose a danger, they can be treated with drugs.

If chest pains are present and the doctor is uncertain that they are coming from the chest wall, he may order an exercise treadmill test using both an electrocardiogram and a thallium-201 scan. This can rule out the possibility of coronary artery disease.

The isotope thallium-201 is unaffected by mitral valve prolapse. The patient receives an injection of a weak radioactive solution containing the thallium. Following the course of the isotope with a special camera, nuclear medicine specialists detect any areas of the heart deprived of normal blood flow (MGH News, January-February 1980).

On rare occasions surgery enters the prolapse picture. Supporting structures around the mitral valve can stretch and rupture, causing the flow of blood back into the atrium to become significant. Some patients will require replacement of the valve.



In these special X rays (angiograms) of a patient's heartbeat, top frame shows (a) mitral valve and (b) left ventricle at rest. Successive frames demonstrate prolapsing, or bending backward, of the valve as the ventricle contracts to pump blood up and into body's main artery.

(Concluded on Page 6)

Asthma: Not Curable But Controllable

Billy was a promising wide receiver for a suburban Boston high school football team. A tall, lean boy, he was blessed with good speed, soft hands, and the innate "nose for the ball" that coaches adore. Unless injured, he was assured of a starting berth on a potential championship team, a lofty position for a junior.

But as the hot late August sun beat down on a dust-covered practice field, Billy began to experience shortness of breath, prolonged wheezing, and an overall sluggishness that belied his otherwise fine physical condition.

By the team's first game, Billy's condition, diagnosed as asthma, forced him to the bench where, in street clothes, he watched his mates roll up a string of impressive scores.

For Billy, it was a season lost to a disease he never before had experienced, but one which felled him as quickly as a bone-jarring tackle.

Asthma, undetected in Billy until he became active in a hot and dusty envi-

ronment, is due to a variety of stimuli that cause the muscles surrounding the lung's airways to contract. This in turn leads to an obstruction restricting the ability to expire air from the lungs.

A condition as old as mankind, asthma today affects approximately eight-million Americans with undetermined millions more unaware they have the disease.

Though still potentially fatal—almost 1,800 Americans died from it in 1978—asthma has been largely controlled by a variety of drugs, and, in extreme cases, a closely monitored program of treatment involving a potent family of medications called corticosteroids.

"The hallmark of asthma," said Dr. Barry W. Levine, an MGH physician and Chief of the Pulmonary Clinic, "is that the obstruction that inhibits the expiration of air is reversible. This is what differentiates asthma from emphysema, which involves irreversible obstruction."

Also different from bronchitis, another common lung disorder characterized by chronic irritation, asthma is a universal disease afflicting persons regardless of age, sex, living environment, or levels of physical activity.

Several stimuli may provoke an attack of asthma: antigenic substances (those which induce and cause a reaction to a foreign particle, such as pollens, mold spores, and animal danders) and nonantigenic substances, such as temperature or humidity changes and air pollution.

"In this regard," Dr. Levine said,



Asthmatics sometimes undergo a pulmonary function test such as this to determine the amount of exercise required to induce an attack of the illness. Later, the test will be repeated to study the effectiveness of various drugs in preventing exercise-induced asthma.

"the mountain air of New Hampshire may be just as troublesome for some patients as the smog-filled streets of New York."

Although there are no distinct common traits among asthmatics, researchers have found that there is a familial predisposition to this disease.

"In other words," Dr. Levine said, "asthma is more common in patients who have a family history of hay fever and other forms of allergies.

Heart Valve

(Concluded from Page 5)

At other times, the mitral valve can develop an infection (subacute bacterial endocarditis), and this can enlarge a leak. Only a very small number of such patients, however, would need a substitute valve.

A temporary presence of bacteria in the blood resulting from dental treatment or from some genitourinary procedure can produce the infection.

To guard against such an infection, Dr. Hutter believes patients with mitral valve prolapse should take antibiotics in connection with dental or genitourinary treatments.

Since mitral valve prolapse involves so many Americans but affects so few life-styles, a temptation exists among some doctors to remain silent in the absence of complications.

Dr. Hutter takes the position that a patient is more reassured if he or she knows what the entity is, that it is benign, but that certain precautions have to be taken on occasion.

What has been learned about mitral valve prolapse has come only in the last two decades. As the studies continue, important new information may be revealed. ■



Children with chronic respiratory problems attend classes to learn proper ways of breathing. Instructor judges how well the youngsters are breathing by movement of the pillows on their chests.

"But familial predisposition is by no means the decisive factor. Many people with no family history of allergies are stricken with asthma. It really can affect anyone."

Once an attack occurs—and a person must generally suffer an attack in order to find out he has asthma—the immediate concern to the patient and physician is to reverse in the bronchial passageway the biochemical imbalance that causes the trapping of air in the lungs.

Dr. Levine said that a large percentage of the approximately eight-million asthmatics in this country can be treated by over-the-counter drugs. While they should be under a physician's care, their conditions are not serious, and when they get a little short of breath, they take a couple of whiffs of a medicated mist, and they get better.

For the others, treatment can be more complex. According to Dr. Kurt J. Bloch, Chief of the MGH Allergy Unit, the severity of asthma is often classified by treatment status. Thus, patients with minimal asthma are expected to show a good response to the occasional use of drugs.

Patients with moderate asthma are expected to show a good response to the long-term administration of drugs (not including the use over a period of time of corticosteroids).

Patients with severe asthma show a good response to long-term administration of drugs including corticosteroids. A small segment of patients with severe asthma show a poor response to all of these measures and require acute or long-term hospitalization.

But even medications used for mild asthmatics can cause changes within the nervous system, such as nervousness, sleeplessness, and nausea, or loss of appetite.

"For the mild asthmatic who suffers the infrequent attack, these side effects are accepted in order to get quick relief," Dr. Levine said.

"For the moderate asthmatic, professional help is crucial. Although not life-threatening, the condition can alter the patient's life-style. That is not necessary."

Used for more than 30 years, "steroids have really been lifesaving in treating severe asthma," said Dr. Levine, "but they can also cause significant side effects. Among these side effects are weight gain, bone wasting, ulcers, bleeding into the skin, increased facial hair, and glaucoma.



Swimming is an excellent sport for asthmatics since participants soon discover breathing control.

"Only if patients are unable to function normally, if their life-styles are hampered, if they require repeated hospitalization, and if all other medications fail should steroids be used," he said. "This probably involves 20 percent of all asthmatics who come to physicians."

The serious asthmatic generally is in-

capacitated because of labored breathing, is unable to eat normally, and is unable to sleep. A cough is often a major source of discomfort along with muscular pain in the chest or abdominal walls. Exhaustion or anxiety may be present.

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If You Have Asthma . . .

Although a cure for asthma has not yet been found, people with the disorder need not withdraw to a sedentary life-style.

Prompt medical attention following the first signs of an asthma attack can usually produce quick relief and a program of effective care to reduce the frequency of further attacks.

Shortness of breath after only a few minutes of exercise, particularly under dry climatic conditions, can sometimes signal the presence of asthma.

If breathing becomes difficult, the individual involved should resist an impulse to hunch over. Forcing the body to straighten up improves breathing efficiency.

Once discouraged, exercise is now allowed for most asthma patients. However, the choice of activities may be narrowed. For example, if dry winter air induces an asthma attack in a jogger, he or she would be advised to

choose another sport. Swimming is highly recommended.

Since children of parents with allergies like asthma can inherit a tendency to allergies, parents with such afflictions should be alert to any odd reactions by their youngsters to certain foods, environmental conditions, household items, or pets. A physician can then administer appropriate tests.

Replacing a favorite feather pillow, finding a new home for the family pet, or avoiding exposure to certain weather conditions might be all that is needed to escape an asthma attack.

Of untold millions of persons who have asthma but do not know it, many suffer from troublesome coughs, such as a smoker's hack, or experience occasional shortness of breath.

Refusing to take the time for a medical checkup, these people continue to suffer. Countless workdays are lost thereby. ■

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Research Produces Better Asthma Drugs

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In these instances, steroids become important.

Carefully monitored schedules of steroids have been largely successful in alleviating the symptoms of the disease. Such programs vary from a matter of a few days to a number of months and, in extreme cases, to a lifelong dependence.

"Every effort should be made to wean the patient from steroids as soon as possible," Dr. Levine said.

One approach to asthma is environmental control, in which those agents that trigger an attack are themselves

eliminated from the person's surroundings.

Immunotherapy, involving a series of injections of extracts of pollens or molds that may be involved in triggering an attack of asthma, has also proved effective in certain patients with the ailment.

Improvement in the understanding of the pharmacology (the study of a drug's reaction on living systems) and physiology of asthma has permitted the development of drugs that are more effective for treatment of asthma and less likely to produce side effects. Inhaled steroids have been introduced that avoid most of the side effects of

oral corticosteroids.

"An important thing, maybe the important thing, in treating asthma is that it is a controllable but not curable disease," Dr. Levine said. "It results from a chemical imbalance that we are unable as yet to resolve.

"When persons are subjected to either heat, cold, humidity, exercise, a noxious agent, or an antigen, their lungs react to it. We try to modulate that reaction, but in no way are we changing the underlying biochemical imbalance which causes it."

On occasion, it is possible to identify a single agent, such as cat dander, as being responsible for attacks of asthma. Complete avoidance of contact with cats may be expected to prevent further attacks even though the person continues to be sensitive to cat dander.

Once their conditions are controlled, most asthmatics can successfully resume their normal everyday activities, including exercise, formerly discouraged if not prohibited in such cases.

"It happens often. A person gets a touch of asthma, then suddenly says, 'I can't run a mile. I can't jog. I can't walk.' And he becomes sedentary," said Dr. Levine. "Such restrictions of activity are unnecessary in most cases. The patient with asthma can do all those things if he has his ailment diagnosed and treated properly." In fact, many top athletes, such as running great, Jim Ryun, suffered from asthma. Patients whose asthma attacks are triggered by exercise can usually be pretreated by drugs.

For Billy, now a senior, his condition still lingers but is controlled by an aerosol spray. Forewarned, his coaches and the team's medical staff are making an oxygen tank available at his preseason practices in the event of future attacks. His athletic future, once literally dust covered, again appears promising. ■



The air resistance being felt by these asthmatic youngsters while blowing through straws at play is similar to what they would experience during an attack of the disease. The playful exercise can prevent anxiety later.



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New Clinic Seeks to Lessen Job-Site Health Risks

Hyperparathyroidism May Give Few Clues

(Second of two articles)

If a person developed a disease for which the only treatment was surgery but the illness seemed to cause no problem, should the individual undergo the operation or leave well enough alone?

With the advent of automated blood tests permitting a single blood sample to be analyzed within minutes for up to a dozen disorders, many people are discovering they have a condition they never suspected they had.

Specifically, the tests in a number of medical centers have revealed a much higher incidence of elevated blood calcium levels than had been recorded in the past. Subsequent tests have shown that in many of these patients overactive parathyroid glands were causing the high calcium readings.

Situated near thyroid tissue in the neck, four pea-sized parathyroid glands secrete a hormone (PTH) which regulates the release of calcium from bones into the blood stream.

Overproduction of PTH, a condition called hyperparathyroidism, can lead to severe weakening of bones, obstructions in the kidneys, mental confusion, and muscle problems. Investigation usually discloses that the hormone production has been thrown off by a benign tumor in one or more of the glands.

In general, physicians have estimated that hyperparathyroidism annually affects one to two persons in every 1,000. As a result of automated blood testing, however, investigators believe the known incidence in the United States may rise by as many as 86,000 patients

each year.

In about half of them, no symptoms appear. The individuals think they are getting along fine when in fact many are not.

During the past several years, the Mallinckrodt Clinical Research Center at the MGH has studied 92 persons with symptomless hyperparathyroidism. More than 45 were found to have developed silent complications that had threatened their health.

Dr. Robert M. Neer, an MGH endocrinologist and Director of the center

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Some people overcome distressful situations by simply erasing the events from their minds. (Story on page 7)

Each year diseases contracted in the workplace affect 390,000 Americans, 100,000 fatally. Another 15,000 succumb from on-the-job accidents.

Yet, occupational health care lags badly. A federal survey conducted in 1977 showed that only 1,000 physicians and 9,000 nurses in this country devoted more than half of their working hours to occupational medicine.

At the MGH, which pioneered studies of industrial health hazards 68 years ago, two young physicians are striving to narrow the current void in medical protection for workers.

Drs. Nancy L. Sprince and Christine Oliver have reopened an Occupational Health Clinic which was established in 1949 by Dr. Harriet L. Hardy, a noted investigator of the hazards of radiation and beryllium.

The clinic closed upon Dr. Hardy's retirement in 1971. Since then, Dr. John D. Stoeckle, Director of the MGH Medical Clinic, has cared for many of Dr. Hardy's patients and has maintained their follow-up records for long-term study of their diseases.

Dr. Sprince underscored the magnitude of the health problem in industry. "Occupational illnesses have often been underreported," she said. "The patient's physician may fail to recognize the illness as work-related. Frequently, data that are collected on illness and death need greater clarity and specificity.

"Also contributing to the confusion is the fact that many chronic diseases fail to exhibit symptoms until years after the illnesses occur. This can make the link with occupational exposure

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EDITORIAL:

Treating Occupational Disease— A Revival

Adults typically spend one third of their weekdays in the workplace. For many, the place of work carries a significant potential for illness or injury. Years ago the dangers that lurked were often obvious: machines that could maim their operators, for example. Laws have generally improved such blatant situations by mandating safeguards.

When more subtle hazards existed, employers and employees were far less likely to know about them. Many years of inhaling coal dust usually go by, for instance, before miners develop "black lung disease" (anthracosis). A disease like asbestosis invaded even more insidiously. Unlike coal dust which can be seen, asbestos particles flying about a manufacturing plant may attack over a period of years without their ever becoming visible. Indeed only the microscopic particles of asbestos constitute a threat. And unless the asbestos coating a ceiling, let's say, is physically disturbed, studies show that it probably represents no hazard.

Gradually American medicine is determining additional risks from old manufacturing processes as well as potential for trouble arising from new techniques. The dumping of chemicals is sometimes turning out to bring the hazards of industry right into the residential neighborhood.

With the heightened attention and increased knowledge of these varied medical problems, there is no wonder that the country suffers from a shortage of experts in occupational disease. As the lead article in this issue demonstrates, the situation at the MGH has been unusual. By establishing an Industrial Clinic in 1912, this hospital helped pioneer occupational health. This trailblazing took many forms over the years but lapsed into a highly informal status in 1971.

With demonstrated need an important consideration, the formal reopening of a modern version of the clinic comes none too soon. The hospital is fortunate to have two superbly trained, bright, enthusiastic, and energetic young physicians to head the renewed unit. Their presence should mean excellent care for patients and the continuance of a rich tradition.

Ward Four Studies Trace the Course Of Gland Illness

(Continued from Page 1)

known for more than half a century as Ward Four, said the complications were varied. Some patients lost more bone thickness or kidney function than would be expected in their respective age groups. Some patients developed silent kidney stones.

Many of the people had come to the MGH with complaints totally unrelated to hyperparathyroidism and were discovered to have the disorder, plus complications, after calcium tests given as part of their evaluation proved abnormal. Corrective surgery was recommended.

One patient, a dentist in his 50s, learned through a screening program that he had contracted the disease. Although doctors in Ward Four informed him that he had already suffered bone loss, the dentist recoiled at the thought of surgery. "I'll check back with you in six months," he said.

The patient returned as promised. His bones had become thinner, but still he felt well. When the subject of surgery came up, he remarked, "My wife and I are still talking it over."

Finally, 10 months after his first visit to the MGH, the dentist had the needed operation, and the bone loss was stopped. If he had waited further, he would have compromised his health, an unnecessary price.

Although advances in medical technology have revealed hyperparathyroidism to be much more common than once thought, they also have demonstrated that the disease may vary greatly in severity.

Dr. Neer said a principal purpose of the Ward Four study is to determine the natural history of the disease. Will patients with uncomplicated hyperparathyroidism develop problems eventually? Can sensitive techniques for measuring bone strength and kidney function detect complications of the

Photographs: Page 1, courtesy of McLean Hospital; pp. 3, 4, 5, Myron Daniels; p. 6, courtesy of MGH Dermatology Department; p. 7, courtesy of Dr. Robert L. Martuza; p. 8, courtesy of Doubleday and Company, Inc.

illness before they cause impairment? And what is the cost to the patient in terms of anxiety levels by undergoing surgery or by not having it?

In an address this year to a medical group in Ohio, an MGH surgeon cautioned that parathyroid operations should not be performed "too soon." Dr. Chiu-an Wang, a leader in the field, said that if the patient's calcium level was not very high and no complications were evident, the surgery would be unwarranted. "A slightly elevated calcium level never killed anyone," he stated.

There is the added problem of finding the tiny glands in the patient if surgery is decided upon.

Dr. Neer explained that the parathyroid glands are identified, in part, by their color. They tend to be brownish.

"If a lot of bleeding takes place when the first incisions are made," he pointed out, "the surgeon's ability to find anything by color is seriously diminished."

"If the patient had previously undergone neck surgery—even 10 years earlier—the chances of bleeding increase because scar tissue would be present. It doesn't take much to provoke bleeding in such tissue."

Because of difficulties encountered at times in hyperparathyroid surgery, the failure rate of such operations, performed in leading medical centers, is about two percent. When the operation is carried out by less experienced hands, the failures increase.

"Eighty percent of the time only one gland is found to be abnormal," said Dr. Neer, who is Associate Professor of Medicine at Harvard Medical School. "The remainder of the time all four



Hyperparathyroid patients in Ward Four are given periodic tests to determine whether the disease has caused any thinning of bone.

glands turn out to have problems."

Numerous efforts are being made to devise effective nonsurgical treatment for hyperparathyroidism.

Scientists at the MGH and elsewhere are studying a new, experimental drug which reverses excessive calcium levels in the blood of animals. Whether the drug is safe, however, remains uncertain. Also, rather than cure hyperparathyroidism, the agent would only block the effects of the parathyroid hormone.

While the search goes on for a nonsurgical treatment, the hyperparathy-

roid patients under study by the MGH pay two-day visits each year to Ward Four to receive an updated evaluation of their bone status and kidney function.

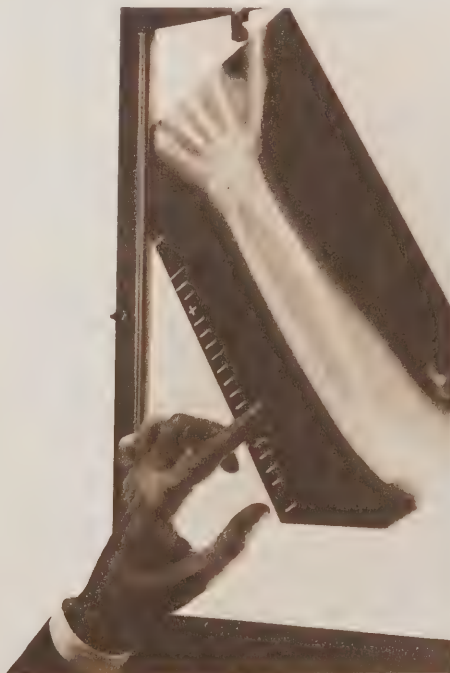
Interestingly, although these patients are being monitored because of an overproduction of PTH, the hormone is being given in carefully controlled trials to patients suffering from osteoporosis. This is a common bone disorder which principally affects men and women in their middle and later years (MGH News, May 1978).

Osteoporosis, caused in part by poor absorption of dietary calcium, leads to a breakdown in the structure of bone, making it thin, porous, and brittle. Physicians believe control of the disease would prevent as many as 350,000 fractures in the United States annually.

"If you give parathyroid hormone in large doses or continuously, it causes bone weakness," Dr. Neer said, "but if you administer it in small doses intermittently, it generates bone formation."

This unusual effect was discovered in 1934 at the MGH by two pioneering investigators of hyperparathyroidism, Drs. Fuller Albright and Walter Bauer. Subsequent studies elsewhere corroborated the MGH data, but then the observation just sat in the medical literature.

Using animal PTH, the research had been conducted on animals. If you gave that hormone to human patients, they



Dr. Robert M. Neer, Director of Ward Four, evaluates an X-rayed arm bone of a hyperparathyroid patient.

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Occupational Clinic Offers Workplace Inspection Visits

(Continued from Page 1)

difficult to establish."

The consequences of inhaling high concentrations of asbestos dust, for example, may not become evident for 30 years or more.

Since the Occupational Health Clinic opened a few months ago, a majority of the patients treated by Drs. Sprince and Oliver have been victims of asbestosis, a scarring of the lungs because of long-term inhaling of asbestos particles.

Asbestos-related disorders constitute a major public health problem in Massachusetts because huge amounts of the insulating and fireproofing material have been used in the state's shipbuilding and repair trades since the 1940s. In the early days much of the work was performed in small, enclosed, inadequately ventilated areas.

Persons involved in the manufacture or installation of asbestos or who work in an area where the mineral is being disturbed are susceptible to asbestosis. Even long-term exposure to a building treated with the substance, however, is harmless unless deterioration causes particles to flake.

The dangers of asbestosis are compounded in an individual who smokes. Studies have shown that the risk of fatal lung cancer is 70 to 90 times greater among cigarette-smoking asbestos workers than among nonsmoking



Because of shortness of breath and exposure to asbestos at construction sites, this man sought to learn at the Occupational Health Clinic whether he had developed a lung ailment. Dr. Christine Oliver, clinic codirector, asks about his work experiences.

persons unexposed to asbestos dust.

Investigators have found, in fact, that up to 39 percent of all cancers are occupational in origin.

The Occupational Health Clinic aims to provide diagnostic and preventive medical services to both individual workers and groups of workers.

Individual patients are referred to the clinic by many sources, including labor groups, health agencies, private physicians, and attorneys. Situated in the MGH Clinics Building, the new unit is open Wednesdays from 5 to 9 p.m.

The clinic's codirectors, who have extensive training and experience in their specialty, also offer on-site inspections of a workplace to identify sources of exposure that present potential or actual health hazards. Specific changes

to eliminate any dangers are subsequently recommended to the employer.

Such proposals might include a substitution of nontoxic materials for the hazardous ones, better ventilation, or the availability of protective devices such as respirators.

On-site inspections could be followed by a program of medical surveillance. For example, in situations in which workers are exposed to lead-based paints, a periodic check of levels of lead in the blood could signal a warning of developing lead poisoning long before any symptoms would appear. For asbestos workers, pulmonary function testing could serve as a health check.

Not long ago, Dr. Oliver visited a pulp and paper mill in Prince Rupert, British Columbia, to investigate what appeared to be an inordinately high rate of heart disease among the workers.

"We identified not only potential heart problems but also potential diseases of the respiratory, nervous, and reproductive systems," the doctor said.

One of the toxic substances to which the workers were exposed is hydrogen sulfide. Viscose rayon workers whose jobs entail the use of both hydrogen sulfide and carbon disulfide have exhibited a high rate of heart disease, but no research has yet been done among groups using only one of those chemicals.

"Our first job was to identify individuals who might be ill," Dr. Oliver said of her Canadian mill visit. "Now we hope to look at the workers as groups because in this way we can better determine if a problem is actually work-related. We will then be able to report on what we see to be wrong and

Hyperparathyroidism

(Concluded from Page 3)

would develop antibodies that would stop the substance from working.

Extreme scarcity of human PTH delayed studies of that molecule, but today, again as a result of pioneering work by scientists at the MGH, the complete chemical makeup of human PTH is known, and the hormone is being produced (synthesized) in laboratories.

An article published this summer in a British medical journal reported on the effects of human PTH given to 22 osteoporosis patients in Britain, France, the Netherlands, and at the MGH. The study showed that once-a-day injections of the hormone could increase bone in

humans.

A major complication still must be resolved. Bones fall into two categories: spongy bone and compact, or dense, bone.

"We've discovered in Ward Four that patients given PTH are developing more spongy bone," Dr. Neer said. "However, measurements of the patients' calcium intake and excretion indicate the mineral is not being retained by the body in any greater amounts.

"The spongy bone apparently is obtaining its calcium from the compact bone, and the latter is not benefiting at all from the PTH.

"This, of course, is no solution. Through further studies we hope to learn why the two types of bone act differently." ■

For Some People, a Life of Heartache

Few people had anything against John Merrick, but during most of his life many saw only his worst side.

Merrick lived in England in the late 1800s. Although gentle and remarkably intelligent, he was plagued by an illness which left him grotesquely deformed from head to foot.

Tumors and pendulous folds of skin marred almost the entire surface of his body. Because of his appearance, he became known in a circus sideshow as "The Elephant Man."

A noted English surgeon, Sir Frederick Treves, rescued Merrick from the eyes of the curious and provided a home for him at London Hospital where his strange malady could be studied.

From that point on, his life of utter loneliness changed. Many celebrities in London befriended him. Royalty visited his hospital apartment and sent gifts.

In 1890, at the age of 27, Merrick died. Because his head was grossly enlarged, he had been forced to sleep in a sitting or crouched position, his head

resting on his knees. Apparently longing to sleep in a normal way, Merrick stretched out on a bed, but the weight of his head dislocated his neck, and he suffocated.

Many stories have been written about "The Elephant Man" since then—including a play produced on the New York stage and a biography just released—but the terrifying disorder which afflicted Merrick throughout his life continues to challenge medical investigators.

The disease is neurofibromatosis.

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recommend what needs to be done."

Dr. Stoeckle and Dr. Homaoun Kazemi, Chief of the MGH Pulmonary Unit, assist in the clinic's affairs as senior advisers. Dr. Kazemi's unit, of which Dr. Sprince is a member, has studied occupational lung diseases for many years.

Also available to the clinic is a battery of consultants, including Drs. Howard Hartley, cardiology; Ernesto Gonzalez, dermatology; Leonard Ellman, hematology; Barry Nocks, urology; Amy Pruitt, neurology; and Reginald Greene and Alfred Weber, radiology.

Since 1977 fewer than three of every 100 new doctors have specialized in occupational medicine. As a result, education plays an important role in the clinic's plans.

Dr. Sprince, an Instructor in Medicine at Harvard Medical School, and Dr. Oliver, a Visiting Lecturer at the Harvard School of Public Health, hope to interest more medical students and young doctors in occupational health.

Talks on the subject will be presented at medical meetings (grand rounds) not only by the clinic's staff but also by invited guests such as labor leaders, lawyers, corporate medical directors, and representatives of government health agencies.

For those who are interested, both clinic and field experience will be available, including opportunities to participate in workplace inspections and the development of medical surveillance programs.

As an outgrowth of the clinic's activities, it may be possible one day to create a registry that would furnish researchers with vital data on the course of specific work-related diseases. Knowing the

patterns of disease in an exposed population can be a first step toward preventing such disease among other groups.

A model for such a registry was established at the MGH in 1952 by Dr. Hardy. Uncontrolled uses of beryllium in various industries, including the manufacture of fluorescent lamps, had resulted in an epidemic of a respiratory disease capable of later affecting virtually every organ in the body. Dr. Hardy's Beryllium Case Registry helped establish guidelines for control of the mineral, and episodes of beryllium poisoning quickly decreased.

Today, however, beryllium is being put to new uses: as a component of the heat shield for rocket nose cones, in the making of gyroscopes and communications equipment, and in metallurgy as a strengthening alloy with copper.

Dr. Sprince, who now directs the

National Beryllium Registry at the MGH, said reports trickle in of new instances of beryllium disease around the country. Working to a large extent on information gleaned from the registry's documentation of some 900 patients, the federal Occupational Safety and Health Administration is reassessing its standards on permissible limits for beryllium exposure.

Sixty-eight years have passed since Dr. David L. Edsall, later to become Dean of Harvard Medical School, opened an Industrial Clinic at the MGH. Interest in work-related diseases has never waned at the hospital.

Drs. Sprince and Oliver would like the newly opened clinic to become a model of outpatient medical services for work-related problems, and they hope their experiences will provide guidance to physicians in other medical centers. ■

Dr. Nancy L. Sprince, clinic codirector, examines worker with suspected occupational asthma. Inhalation of fumes or dust can produce the disorder.



Neurofibromatosis May Be Detected From Skin Spots

(Continued from Page 5)

Undoubtedly a strange word to many lay people, the illness nevertheless is not that uncommon. It affects some 100,000 Americans, although only to a mild degree in the vast majority.

Also known as von Recklinghausen's disease after a German pathologist who first described it in detail a century ago, the malady is believed triggered by genetic changes which somehow disrupt cells in "the neural crest," an area of the central nervous system.

During formation of the fetus, the neural crest, situated next to the spinal cord, develops the nerves of sensation as well as so-called Schwann cells which coat the nerves with a protective substance called myelin. The neural crest also governs production of melanocytes, the pigment cells of the skin.

The odds are 50-50 that someone who inherits neurofibromatosis will pass it on to an offspring. The disease can also stem from an unexplained alteration of a gene during prenatal development (spontaneous mutation).

In more than 90 percent of the patients, a characteristic sign of the disease at birth or in infancy is the appearance on the skin of six or more *café au lait* spots, each light brown area at least half an inch in diameter. A smaller number of such spots occur in normal children.

If the disease is present, an electron microscope would reveal abnormally large pigment particles in material biopsied from a suspected *café au lait* spot.

Freckling in the armpits or a pigmented spot in the iris, the colored portion of the eye, also can alert a physician to the possible presence of neurofibromatosis.

Skin tumors called neurofibromas rarely occur before the patient reaches puberty. A mysterious proliferation of Schwann cells causes the tumors to form at nerve endings just under the skin. Deeper neurofibromas typically incorporate the nerve within them while growing, and a surgeon trying to remove a tumor often must sacrifice the nerve itself.

In addition to having telltale *café au lait* spots and neurofibromas, the pa-

Visible on this patient stricken with neurofibromatosis are tumors just beneath the skin and a characteristic *café au lait* skin mark.



tient may develop changes in bone structure, such as the head enlarging or one leg becoming longer than the other. Excessive skin and tissue may hang from the body. And multiple tumors may appear wherever nerves travel in the body.

Work at the MGH on acoustic neuromas, brain tumors originating on an auditory nerve (*MGH News*, June-August 1980), has sparked studies which may shed new light on neurofibromatosis.

"We know that bilateral acoustic neuromas [a tumor occurring simultaneously on each side of the brain] are associated with neurofibromatosis," said Dr. Robert L. Martuza, an MGH neurosurgeon.

He explained that in removing a single neuroma a surgeon often can preserve the patient's facial function and sometimes can save hearing in the affected ear. In operating on bilateral tumors, the results are much less satisfactory.

"Most tumors in the body start from a single cell, and as each tumor grows it simply pushes nerves away," the doctor said. "In a patient with neurofibromatosis, however, the tumors seem to be multicellular in origin and, as a result, they encapsulate the nerves.

"If we could show that bilateral acoustic neuromas start from many cells, it would explain why the surgical outcome is less good. We could look for new methods of treatment."

In collaboration with David T. MacLaughlin, Ph.D., and Dr. George S. Richardson, both of the MGH Gynecological Service, Dr. Martuza is look-

ing into the possibility that neurofibromatosis may be responsive to hormonal manipulation.

"The tumors of neurofibromatosis may enlarge or first appear during puberty or during pregnancy, and they may improve following delivery," he said.

"Additionally, people with neurofibromatosis sometimes develop meningiomas [tumors affecting one or more of the membranes covering the brain]. Meningiomas have a receptor on them which is responsive to estrogen, a common female hormone.

"Breast tumors have a receptor for estrogen, and we can now treat these growths by manipulating the hormone. But no one has ever done this for meningiomas or the other tumors of neurofibromatosis. We're looking into this now among neurofibromatosis patients. If we could check the growth of multiple tumors early by some hormonal method, we would help the patients tremendously."

Dr. Martuza, an Instructor in Surgery at Harvard Medical School, also is working with Dr. Thomas B. Fitzpatrick, Chief of the MGH Dermatology Department, to determine how health professionals might more readily recognize neurofibromatosis.

The investigators, in addition, believe that their studies would make great strides if they could develop an animal model for the disease.

Studies have shown that sensory nerves in normal animals control the reproduction and growth rate of Schwann cells. If an animal could be bred with neurofibromatosis, researchers could learn how the sensory nerves

Avoiding Stress Through Amnesia

When great strain or anxiety besets a person, he or she usually seeks help to overcome the conflict which precipitated the emotional storm.

Some people, however, follow a different course. They simply forget their troubles. Literally.

Psychiatrists describe amnesia as the most common of the "dissociation responses." With hysteria providing the mechanism for the memory loss, the individual's unconscious drives out of his or her mind those experiences which had been causing the distress.

Amnesia also can result from physical changes in the brain, but if a patient's brain and intellectual faculties remain unimpaired, the memory loss usually arises from psychological reasons.

In the absence of documented physiological disturbances, or tangible evidence of malingering, a physician may sometimes find it difficult to prove or disprove amnesia conclusively. Where room for doubt exists, skeptics abound.

Such was the case in December 1926 after famed English mystery writer Agatha Christie vanished from her home in a village an hour's drive from London.

After thousands of police and volunteers searched for her for 10 days, Mrs. Christie turned up at a resort hotel in the north of England. She had registered under a different name and appeared to be enjoying her stay.

However, two physicians, including a specialist in nervous disorders, examined the writer, then 35, and decided that she had unquestionably suffered from loss of memory.

At the time of her disappearance, Mrs. Christie and her husband were having severe marital difficulties. In addition, the death of her mother earlier that year had deeply affected her.

Although Mrs. Christie may have had a subconscious desire to escape from her mental anguish, many citizens who scrutinized daily front-page news accounts of the search for her rejected the diagnosis of amnesia. Pointing out that she did not behave at the resort like an ill or disturbed woman, they felt she could have concocted the disappearance to strike back at her husband.

To this day, the story of mystery writer Agatha Christie remains a subject of controversy, a real-life mystery.

So-called global amnesia in which someone forgets everything—identity,

whereabouts, and actions—rarely occurs. Only about three such patients appear for treatment each year at the MGH Emergency Ward.

Partial amnesia, however, in which a person forgets something specific, is much more prevalent than one might imagine.

"We sometimes overlook appointments because we really don't want to see the other person," said Dr. Thomas P. Hackett, Chief of Psychiatry at the MGH. "Forgetting such engagements until the next day is a variant of amnesia."

Much more dramatic are the mind's attempts to erase tragedy. Dr. Hackett recalled a young man who was involved in a motorcycle crash which killed his girl friend. Revived from a coma and treated for a broken arm, the youth remembered the crash but not the presence of the girl. Clearly, he did not want to know what had happened to her. The amnesia protected him.

With treatment, his memory returned fully. Although saddened by the friend's death, the motorcyclist did not suffer any permanent psychological damage.

His amnesia may have stemmed from both an emotional shock and a blow to

(Concluded on Page 8)

affect Schwann cell growth when the disease is present. Such studies would be difficult to carry out in humans.

As efforts are redoubled to learn more about neurofibromatosis and to evolve an effective medical treatment, surgeons often can aid patients. Sometimes the doctors operate purely for cosmetic reasons, removing outwardly visible tumors when they appear. At other times, surgery is able to block potentially serious internal complications.

"In general," Dr. Martuza declared, "the prognosis for most children with neurofibromatosis is good. Only about 10 percent have brain or spinal cord involvement. Many who have only skin problems can live normally. Some people with the disease don't even know they have it."

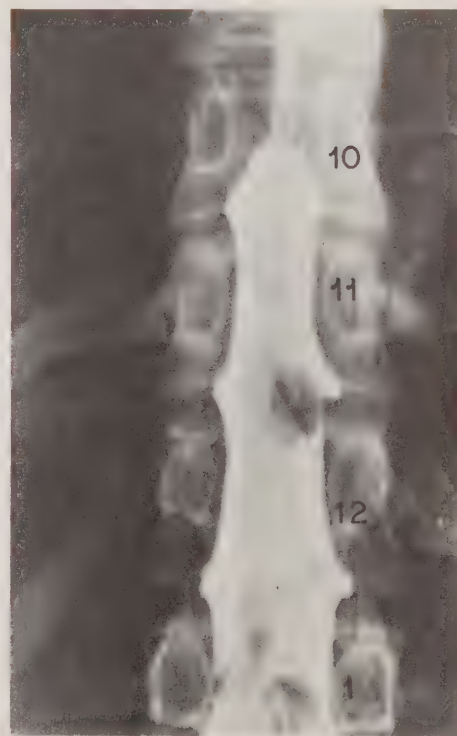
The issue of transmitting the disease must be discussed, however, with families. Affected adults must be made aware that if they inherit the illness the chances are even that they will pass it on to their own children.

A person whose malady resulted from a spontaneous genetic mutation will also be able to transmit the disorder, but under these circumstances assurances can be given to the patient's parents, brothers, and sisters. Family members other than the patient himself will be able to have children with no greater risk of neurofibromatosis than that faced by the general population.

Because so much needs to be learned about the disease, a National Neurofibromatosis Foundation was organized two years ago. Thus far, chapters have sprung up in New York, Massachusetts, Arizona, Michigan, and Washington, D.C.

The foundation provides information about the illness to patients and their families, as well as to health workers, and also promotes scientific research.

Just as important, the organization fosters in people what is needed most by those with neurofibromatosis . . . compassionate understanding. ■



Numerous tumors can be seen in this spinal cord X ray (myelogram) of a patient suffering from neurofibromatosis.

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Curing Amnesia Requires Medical Help

(Concluded from Page 7)

the head. Psychological and physical mechanisms sometimes overlap in producing amnesia.

Dr. Hackett cited a variant episode of memory loss. A teen-aged man was the sole survivor of an automobile accident which killed three companions, including his brother. The survivor remembered the crash but was not consciously aware that his brother was among those fatally hurt. To account for the presence of a third victim, the patient insisted a hitchhiker had been given a ride.

"We had to tell the patient about his brother's death," Dr. Hackett said, "because the young man not only had forgotten about the brother's presence in the crash but was also beginning to hallucinate to avoid becoming aware of his deep, personal loss."

Trying to restore someone's memory is not a task for a layman but requires the skills of a physician.

"Once memory begins to return it can come back in a torrent," said Dr. Hackett, who is a Professor of Psychiatry at Harvard Medical School. "The patient may remember everything that occurred over many days in a matter of minutes."

"If he has forgotten an event that would make him terribly depressed, the loss of a spouse or a child, for instance, a sudden flooding back of his memory could produce a suicidal depression. Although this doesn't happen very often, it is always best to restore memory slowly."

In contrast to being jolted back to reality from so-called psychogenic amnesia, any recovery of memory lost as a result of brain cell changes caused perhaps by disease or a head injury would be more apt to be gradual and sometimes incomplete.

When advanced age leads to a degeneration of brain cells, the individual may clearly remember events of a generation ago but be unable to recall recent happenings, or, for that matter, even the name of a close, living relative. Short-term memory could vanish.

While organic amnesia can occur at any time of life, the psychogenic type is most commonly observed among people ranging between 20 and 50 years of age. Men and women are affected equally.

Why hysteria may lead to amnesia in some individuals and in others to different symptoms, such as blindness, deafness, or loss of sensation in a hand, no one can say with certainty, but Dr. Hackett suggests that specific personality problems set the stage for one type of symptom over another.

Observing a relative who is forgetful,

for example, might create a subtle tendency toward the same characteristic, the doctor theorized, and thus make a person more susceptible than someone else to amnesia.

If a person develops amnesia because he subconsciously wants to escape from reality, can he also decree an end to that clouding of the mind?

"No. He has no control over his condition," Dr. Hackett said. "But normally it wouldn't take much to unlock the door."

"To help a patient regain his memory, a doctor might get someone from the person's past to tell the person who he is. Just the sight of a once familiar face could begin to turn the key in the lock. You could then proceed to cite facts to the patient about his past. Even the simple playing of a song could remind him of many things and slowly bring him around."

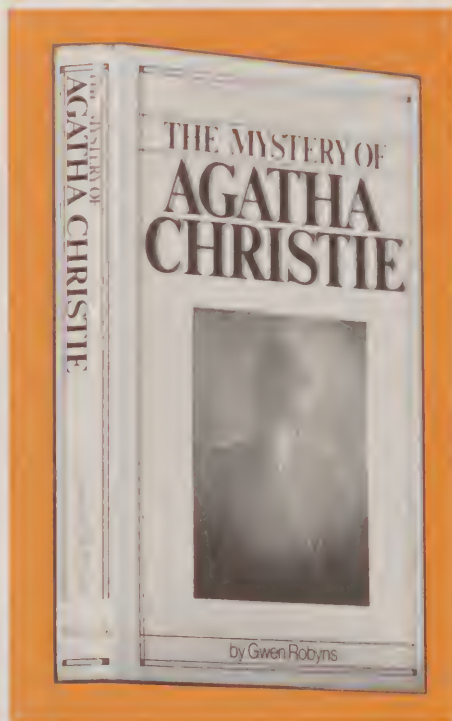
To assist him, the physician might use hypnosis. But the emotional turmoil affecting the patient might be too severe for hypnosis to succeed.

Sodium amytal, or so-called truth serum, also might help. But again the amount of stress plaguing the patient could negate the treatment.

Some of the time, according to Dr. Hackett, amnesiacs may appear somewhat indifferent to having their memory restored. In fact, if they have global amnesia, virtually complete loss of memory, they might become a bit nervous over the thought of rediscovering their past. Many patients with this type of memory loss fear that at one time they may have committed some terrible act.

"Theoretically, amnesia can remain with a person for the rest of his life," Dr. Hackett pointed out. "He can take on a new identity and establish a new home and occupation. But such situations are not at all common."

By contrast, most people afflicted with amnesia usually regain their memory after only a week or two. ■



"The Mystery of Agatha Christie" contains a detailed account of her brief but much publicized disappearance in 1926, an event which was attributed to amnesia.



Clearing Blood of Disease With Plasma Exchanges

Assault on Hypertension Brings Results

A quiet revolution is slowly overtaking America's number one health problem.

Of 35-million Americans estimated to have high blood pressure, or hypertension, only 20 percent receive adequate treatment.

Forty percent know of their condition but either take inappropriate medication, follow an improper drug treatment plan, or shun therapy altogether.

The rest of the nation's hypertensives are completely unaware that they have a physical condition capable, in advanced stages, of crippling the heart, kidneys, or brain.

The statistics are changing for the better, however. Government studies show declines in the numbers of deaths and illnesses from diseases associated with abnormal blood pressure.

The consensus is that, armed with the know-how to control hypertension safely and effectively, physicians and nurses are reaching more people who have the problem and are succeeding in bringing them into the fold.

Programs conducted at the worksite not only to detect the condition but also to treat it on the job have proved so successful that the MGH has launched the same undertaking on behalf of its own more than 8,000 employees.

Dr. Eve E. Slater, an MGH cardiologist and Director of the hospital's Hypertension Unit, conducts the new program, assisted by Miss Honor Keegan, RN, program coordinator; Mrs. Carol Reynolds, RN, manager of the Staff Clinic, an outpatient service for employees; and Miss Regina Craf-

fey, RN, of the Training and Development Office.

Dr. Slater did not have to look far to assess the merits of a worksite plan before she proposed the project to MGH administrators.

Three years ago this month, a medical team at the MGH-Chelsea Unit launched such a program in the Chelsea-Everett-East Boston area (*MGH News*, January-February 1978).

Invited into 13 plants having work forces ranging from 40 to 400, the team, headed by Dr. Terrence A. O'Malley, screened some 1,500 individuals. Ap-

(Continued on Page 4)



Technician Elizabeth Burns prepares a special fluid to replace plasma that will be removed from a patient.

After being virtually unable to move for a year because of a neuromuscular disorder, a middle-aged businessman was brought to the MGH to begin a new treatment.

For his first two visits, he arrived on a stretcher in an ambulance.

For the next two, he rode in the family car with his wife at the wheel.

For the fifth and sixth, he drove the car himself.

Only two weeks had passed since the first appointment!

Soon after dramatically reversing the ravages of his illness, called myasthenia gravis, the patient was able to function well enough to resume full direction of his personal and business affairs while continuing under medical care.

The turn of events followed a series of "plasma exchanges," a procedure that is being applied increasingly today in a number of major medical centers not only to treat myasthenia gravis but also a host of irregularities associated with blood circulation and the body's immune (disease-fighting) system.

A plasma exchange involves removing the plasma or largely liquid portion of a patient's blood and substituting a replacement fluid. In this way the body can dispose of abnormal proteins or antibodies produced in the plasma.

The separation of plasma from red and white cells of the blood as well as from clotting factors called platelets became possible in 1914 with development of a concept known as plasmapheresis. Originally, the primary purpose was animal blood research.

With the advent of plastic bags to

(Continued on Page 2)



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EDITORIAL:

Can Television Treat Hypertension?

High blood pressure has reached a crossroad. Doctors stand ready to wipe it out as a major indirect killer. Unlike many 20th century medical advances, however, the onslaught on hypertension does not follow the development of a vaccine. Witness measles, polio, and diphtheria as examples of diseases which *are* yielding to inoculation.

There *is* no hypertension vaccine. Nobody can inoculate a person to prevent blood pressure from ever rising. Because of the nature of hypertension, such an approach seems far fetched at best. As a page 1 article explains, however, hypertension has become a controllable condition, controllable through medication. Once a hypertensive begins medication, the condition almost never worsens as long as that person continues taking pills.

There indeed is the rub. For many people the temptation lies in abandoning the medication once it controls the problem. The sequence repeats itself again and again: Patient with very high blood pressure goes on medication. A few months later the doctor says, "Excellent, you have no sign of hypertension. Your blood pressure is perfectly normal. Just keep taking your pills, and you'll be fine."

Elated, the patient goes home—or wherever—to celebrate. "No more hypertension," he tells his wife. "Doctor says I'm perfectly normal." What the patient fails to remember is the admonition to continue the medication. Once the column of mercury inside the sphygmomanometer provides good news, it is human nature to dispense with the ritual of popping pills. To begin with, especially when feeling well, no one likes to take medication over a lifetime. Add the doctor's congratulations that the machine shows your problem is under control, and the result for many is predictable.

The trouble, of course, is that the next step is even more predictable: a return of hypertension.

And all so unnecessary. Perhaps television ought to flash subliminal messages at prime time: HIGH BLOOD PRESSURE IS A LIFE-LONG CONDITION. IT IS NOT YET PREVENTABLE OR CURABLE. IT IS CONTROLLABLE. KEEP TAKING YOUR PILLS.

Abnormal Antibodies Bring Greatest Call To Extract Plasma

(Continued from Page 1)

hold blood, physicians saw a place for plasmapheresis in the treatment of humans. It was not until a few years ago, however, that blood-cell separating equipment reached a degree of proficiency that permitted plasma exchanges.

Faulty antibodies account for more than 95 percent of plasma exchanges. Originating in the gamma globulin of plasma, antibodies are supposed to attack specific foreign substances invading the body. When the makeup of the antibody is abnormal, however, it goes after whatever is closest to its own chemistry. This could create an "auto-immune disease" in which antibodies attack the body's own cells instead of foreign ones.

Suppose, for example, a person's body creates an antibody to counter a specific infection, such as one called beta streptococcus. If the defensive agent turns out to be nonspecific to that infection, the antibody might instead attack the patient's own heart valves. The result? Rheumatic fever.

In addition to myasthenia gravis, plasma exchanges to extract unwanted antibodies are being prescribed in the treatment of disorders such as multiple sclerosis, systemic lupus erythematosus, Guillain-Barré syndrome, polymyositis, rheumatoid arthritis, severe asthma, excess cholesterol in the blood (hypercholesterolemia), and a decrease in platelets (thrombocytopenia).

Doctors also use the exchanges in treating blood abnormalities called cryoglobulinemia and macroglobulinemia. The first involves a protein that tends to congeal in the blood when the patient is exposed to temperatures of 40°F and below. The second illness produces very large proteins which thicken the blood.

"When we began doing plasma exchanges last year, we did six during the first six months of the program," said Dr. Charles E. Huggins, Director of the MGH Blood Transfusion Service. "Today, we schedule approximately 60 a

Photographs: Page 7 (upper), courtesy of Dr. Walter C. Guralnick; p. 8, courtesy of Dr. Richard R. Litherthson; all others, Myron Daniels.



Dr. Jettie V. Hunt attends a patient undergoing a plasma exchange.

month. Overall, the results have varied tremendously. In some patients we have witnessed excellent, even startling, benefits. In other patients, we have seen no improvement at all."

Some medical centers in the country, notably in California, perform considerably more plasma exchanges than the MGH.

An exchange may require anywhere from 1½ to 3 hours, depending on the flow condition in the patient's veins and how much plasma has to be removed. Usually, the quantity extracted comes to about a gallon. The patient may undergo three exchanges a week for two weeks, or some similar plan.

The replacement fluid consists of saline (a salt solution) with five percent albumin, a form of protein. As a component of plasma, the patient's own albumin is withdrawn during an exchange. The health caretaker must replace the protein continuously because a lack of albumin would permit fluid to leak from blood vessels into surrounding tissue, producing a swelling known as edema.

"We're working very hard at the MGH to try to find a way whereby during an exchange we can separate the patient's albumin from his plasma and give his albumin back to him," Dr. Huggins said. "Obtaining substitute albumin is the biggest factor in the present high cost of plasma exchanges."

Since some clotting factors (fibrinogen) are removed in a plasma exchange, the attending physician or nurse special-

ist always checks the patient in advance for any preexisting coagulation problems. If any are found, fresh-frozen plasma containing clotting factors frequently will be given during the plasma exchange.

Dr. Huggins said, however, that he and his staff try to avoid using such plasma because of the risk, although minimal, that the plasma might transmit hepatitis.

If a preexamination of a patient indicates that he has a condition requiring antibody protection, he will receive that aid in the form of gamma globulin injections in association with the exchange treatment.

Usually, prior to an exchange, a patient also will receive doses of a so-



Dr. Katharine Kosinski checks the weight of a patient's extracted plasma to make sure it equals that of the substitute fluid.

called immunosuppressive drug, such as cortisone or prednisone, to help suppress the body's production of the faulty antibody.

Dr. Huggins or one of the assistant medical directors of the Blood Transfusion Service, Dr. Jettie V. Hunt or Dr. Katharine S. Kosinski, personally supervises each plasma exchange. The machine that is used is portable and can be operated at a patient's bedside, if necessary.

Dr. Vincent P. Perlo, Director of the MGH Myasthenia Gravis Clinic, first prescribed plasma exchanges for a number of his patients in August 1979.

"The procedure is extremely helpful," he said, "in tiding over patients whose myasthenia [abnormal muscular weakness] has worsened acutely. Although very effective, the exchanges are only a part of an overall treatment program."

Some patients must undergo them periodically to maintain benefits. Others need no more than the customary six.

"One individual with myasthenia gravis completed a series of plasma exchanges a year ago and, while continuing conventional treatment, has been fine ever since," Dr. Perlo said. "At one earlier time during his illness he had to spend almost eight months on a respirator."

Dr. Perlo said plasma exchanges also permit physicians to reduce the amount of steroid hormones which some myasthenia patients have to take and thus lessen the degree of undesirable side effects from the drugs.

About 30 MGH patients with multiple sclerosis have undergone plasma exchanges and, according to Dr. David C. Poskanzer, a specialist in treating the disease, about half have benefited.

"I think the procedure works only with patients who have active disease," he said, "and that status is not always easy to determine."

"Sometimes, for example, a person's affliction may seem to worsen when he develops muscle spasms from a lesion, but the lesion may be one or two years old. The disease itself may not be currently active."

Dr. Poskanzer is trying to devise a formula by which MS patients most likely to benefit from a plasma exchange can be identified. Cerebrospinal fluid cell counts figure in some of the doctor's studies.

Dr. Allan H. Ropper, Director of the
(Concluded on Page 4)

Hypertension Yields To a Wide Array Of Potent Drugs

(Continued from Page 1)

proximately 15-to-20 percent were found to have hypertension. They were given the option of treatment at the worksite or in the office of their own physician.

Mrs. Thelma Tisdale, RN, coordinator of the program, commented that during the screening of workers at one plant three members of the same family were found to have significantly elevated blood pressure. All now receive treatment at their worksite.

Commenting on his ongoing program, Dr. O'Malley said, "I am sure that half the people we have under treatment would not have come under medical care if we hadn't sought them out."

The MGH team revisits some plants each year at their own request to update blood pressure screenings.

The campaign at the MGH to root out "the silent killer," as hypertension is sometimes labeled, began with establishment of outposts in strategic areas of the hospital where on certain days employees could stop in to have their blood pressure checked. One such outpost is situated next to the hospital's main employee cafeteria.

Dr. Slater and Miss Keegan also meet with employees at their jobs to spread



The perils of hypertension and how the condition can be controlled are described to a gathering of MGH employees by Dr. Eve Slater.

word of the new service and to cite the importance of such a checkup.

"Some people assume that if you have hypertension you have to be 'hyper' or tense," Dr. Slater said. "This is not so. Hypertension can affect anyone."

Even though elevated blood pressure exhibits no symptoms, it can force the heart to work beyond safe limits, interfere with the ability of the kidneys to filter impurities from the blood, and rupture blood vessels in the brain.

All of this can be avoided.

"Some people hesitate to have their blood pressure checked because they

fear if they need treatment they will be asked to do something unpleasant," Dr. Slater said. "The fact is that in probably 95 percent of patients blood pressure can now be controlled without any adverse side effects."

Although proper control might mean taking a couple of pills daily, perhaps for the remainder of a lifetime, a wide variety of drugs is available, so that if one causes complications it can be replaced by another.

Patients who begin a particular drug program rarely have to increase their dosage because, as Dr. Slater put it, "you decrease your risk almost immedi-

Plasma Exchanges

(Concluded from Page 3)

MGH Neurological-Neurosurgical Intensive Care Unit, reported that plasma exchanges have generated extreme interest among neurologists who treat patients stricken with Guillain-Barré syndrome. The disease, observed to follow a number of viral infections, can cause almost complete paralysis, lasting for months. After that long recuperative period, though, most patients survive. Those who do usually recover completely from paralysis.

Dr. Ropper related an episode involving a 34-year-old veterinarian who felt a tingling in his arms and legs and became paralyzed three days later. Diagnosed as having Guillain-Barré syndrome, the patient underwent three plasma exchanges. In just one week

instead of the usual many months, his paralysis vanished, and he no longer needed the support of a respirator. In two weeks, he was back home, active once again.

Although not all Guillain-Barré patients given plasma exchanges have improved, favorable results at the MGH and other major centers have led to a federally sponsored study of the procedure as a treatment for the syndrome. Organized by Johns Hopkins University Medical Center, 20 institutions, including the MGH, are involved.

In patients who need surgery for some condition but who have blood coagulation problems because of a low platelet count, plasma exchanges have been immensely valuable.

Dr. Huggins, who is also an Associate Professor of Surgery at Harvard Medical School, told of a man in his early 70s who needed a coronary artery by-

pass operation, but a low platelet count made the procedure too risky.

Solving the low-platelet problem would have meant removal of the patient's spleen, but this could not be done either. His heart might not stand it.

After three plasma exchanges to dispose of antiplatelet antibodies, the patient's coagulation difficulty was eliminated long enough for him to receive his bypass graft and then have his spleen taken out.

Although the results of numerous studies of plasma exchanges have been published in scientific journals, much more investigating lies ahead.

"Some researchers," Dr. Huggins said, "are working to develop a method whereby physicians will be able to selectively remove faulty antibodies from plasma and then return the rest of the plasma to its owner. That would be quite an advance." ■

ately when you go on medication. This is a condition that virtually never gets worse once treatment has started."

The familiar arm-cuff device (sphygmomanometer) employed for blood pressure checks enables doctors and nurses to obtain two pressure readings: (1) the *systolic*, signifying the force that blood exerts against the walls of arteries as the heart pumps, (2) the *diastolic*, representing the pressure prevailing as the heart relaxes between beats.

What is normal? Physicians, as a guideline, regard a systolic/diastolic reading of 120/80 as ideal. In general, for men under 45 years of age any measurement under 130/90 would be safe. Because they are not confronted with certain other cardiovascular risk factors, premenopausal women whose blood pressure reaches 150/95 are generally considered safe.

Actually, physicians emphasize that determining what is normal for a person depends on many factors, i.e. age, overall physical condition, and past medical history.

The comparative importance of systolic versus diastolic levels has often been debated. Since diastolic pressure represents the resting level of blood pressure, should it be considered a better barometer of hypertension? The consensus seems to be that a rise of either systolic or diastolic constitutes a risk factor and that, in general, if hypertension is present both figures will exceed the normal range.

The MGH blood pressure screening requires only 10 minutes of a person's time. The employee fills out a brief,



Honor Keegan, RN, (seated at head of table), coordinator of MGH hypertension screening program, discusses planning with, from left, Donna Fitzgerald, RN, head nurse on Bigelow 7; Patricia Marsters, transcribing secretary on that floor, and Maureen Banks, RN, and Judith Dzyak, RN, nursing instructors.

confidential form, his blood pressure is taken and recorded, and he is given a copy.

"If an individual's blood pressure seems high, we suggest a return visit for a second reading," Dr. Slater said. "Initially, some people become tense and cause their pressure to become abnormal. If on two occasions the pressure is found to be high, then the person probably does have a tendency toward hypertension."

Basically, the drugs used to treat hypertension fall into two classifications. A diuretic most often is prescribed first. It rids the body of excess fluids and salts and thereby relaxes blood vessels. If necessary, the doctor may next prescribe a drug such as

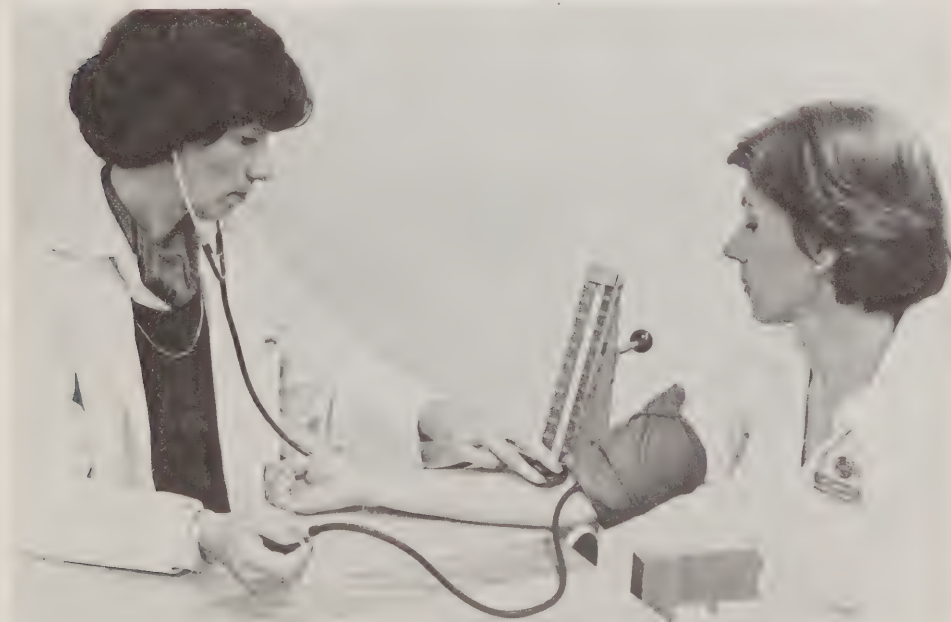
methyldopa or propranolol. They affect the subconscious (autonomic) nervous system, specifically the force of heart and blood vessel contractions. Usually, the two types of medications are eventually combined.

A tiny percentage of hypertensives have a condition called malignant hypertension. (It has absolutely nothing to do with any malignancy.) In these patients, blood pressure can rise precipitously and lead to a stroke, heart attack, or kidney failure in a matter of days. Most often, the patient triggers the crisis by suddenly stopping his medicine.

"Fortunately, the incidence of malignant hypertension is on the decrease," said Dr. Slater, who is an Assistant Professor of Medicine at Harvard Medical School. "I think we see only about one such patient a year now at the MGH."

Some people have what is known as labile hypertension; their pressure fluctuates between normal and abnormal. Generally, this means the person is entering a phase when he may develop high blood pressure. Physicians usually schedule periodic checkups for these individuals so that if it becomes necessary they can be treated.

Dr. Slater cautioned women that the use of estrogens and oral contraceptives can raise blood pressure. "A small blood pressure rise, which occurs in most women, is not particularly dangerous," she remarked, "but about five percent of women appear to be exquisitely sensitive to these agents; their blood



After their meeting, Mrs. Banks decided to have her blood pressure checked by Miss Keegan.

(Concluded on Page 6)

Arthritis Strikes Young as Well as Old

Until relatively recent years, when a child developed fever, skin rash, lymph node swelling, anemia, and loss of weight, a long period of hospital investigation often ensued.

Some youngsters even underwent exploratory surgery in search of possible infection before puzzled physicians reached their findings: juvenile rheumatoid arthritis (J.R.A.).

Today, details of the disease have been so widely disseminated that even when joint inflammation is not clearly evident doctors can recognize the disorder quickly and spare the patient a host of lengthy diagnostic procedures.

Far from being a disease of advanced age, rheumatoid arthritis—the most painful and crippling form—affects some 250,000 children in the United States.

As with its adult counterpart, J.R.A. lacks a cure, and room exists for improved treatment. But a number of gains *have* been made in the area of diagnosis. For many patients the earlier the diagnosis, the brighter the outlook.

During the past 10 years or so, inves-

tigators have recognized four subtypes of J.R.A., which has also become known as juvenile polyarthritis.

The subtype already mentioned is called Still's disease after a British pediatrician, Dr. George F. Still, who first described it.

Affecting about 30 percent of children with J.R.A., Still's disease may develop in boys or girls at any early age, but they usually overcome the illness by the time they reach their mid-teens.

During the period the disease is active, however, some patients endure severe arthritis, and even though it may later "burn out," they may be left crippled. Any joints may be affected.

A second subtype, involving 35 percent of youngsters with J.R.A., plainly underscores the importance of as early a diagnosis as possible.

Called pauciarticular rheumatoid arthritis, the illness tends to attack few joints but frequently produces an inflammation of the eyes.

"It's usually a very low-grade inflammation, so the child may not exhibit any

symptoms," said Dr. John A. Mills, a physician in the MGH Arthritis Unit. "Nevertheless, left untreated, the problem can cause tremendous eye damage, even threaten loss of vision."

The disease rarely occurs in children beyond 10 or 11, but a youngster already stricken may carry the disorder into adulthood.

"The patient may seem to do quite well even though two or three joints may not work very efficiently, but the eyes require close attention," said Dr. Mills. "Since the inflammatory process affecting the eyes is so low-grade, special tests are necessary on a frequent basis. Medicine can control the difficulty."

Pauciarticular rheumatoid arthritis tends to be much more prevalent among girls than boys.

In contrast, J.R.A. subtype three, a juvenile form of a spinal disorder called ankylosing spondylitis, attacks four times as many young males as females.

Striking about a quarter of all children with J.R.A., ankylosing spondylitis tends in the beginning to affect large joints such as the knees and hips. Back

Hypertension

(Concluded from Page 5)

pressure can go sky high."

Menopause is also a time when women should be more conscious about their blood pressure. Usually lower than that of men, the pressure in women tends to catch up at this time of life, and stay up. No one knows what causes this, although a change in bodily messengers called hormones is one possible culprit.

Of the various body organs affected by high blood pressure, the brain receives the most devastating damage. *A noted MGH neurologist has estimated that half of all strokes could be prevented by perfect control of blood pressure.*

Because of the introduction of effective drugs against hypertension, brain hemorrhages are less common, and those that do occur seem to happen later in life.

Twenty-five years ago, a postmortem examination frequently disclosed a brain with 10, 20, even 30 "hypertensive scars." Each indicated a minor stroke which probably had only a brief effect, such as double vision, dizziness, or a little mental confusion. Today, examination of a brain at autopsy reveals only a few hypertensive scars at

the most. Further evidence of the quiet revolution.

Although the ability to treat the hypertensive has advanced tremendously, researchers pursue studies such as those on a kidney substance called renin (*MGH News*, December 1976–January 1977) to learn what causes high blood pressure and how it can be prevented.

One MGH doctor summed up the

problem:

"It's the roll of the dice. If everybody with high blood pressure were guaranteed to have a stroke, everybody would get treated. But who doesn't know a Mrs. Smith, for example, who had hypertension and lived to be 88? People must be convinced that they can't get by on averages. Run frightened, if necessary, but get things under control." ■

Some Hints for People who take High Blood Pressure Medicine



You and your doctor, nurse and pharmacist are partners

1. Ask your doctor, nurse, or pharmacist if you have questions about your medicine.
2. Write down the instructions on how to take your medicine.
3. Tell your doctor if you think your medicine is causing problems.

symptoms may not appear until adolescence.

Subtype number four, fortunately the least common, is in essence adult arthritis occurring in children. The disease involves multiple joints and almost invariably persists into adulthood. The incidence of crippling is quite high. Fewer than 10 percent of youngsters with J.R.A. have this particular form.

The basic treatment for the various kinds of rheumatoid arthritis in children is the same as that for adults. First, a program calling for aspirin. If that proves insufficient, the doctor can proceed to use gold salts. Generally, they turn out to be quite effective in children.

A number of anti-inflammatory, non-steroidal drugs also have been used in children on an investigational basis. The drugs are reasonably effective and quite well tolerated by the young patient.

Corticosteroids, power-packed hormones often capable of providing quick relief to the arthritic, come into play only as a last resort. Not only do these drugs expose children to the same potentially serious side effects that confront adults given the medication they also pose a threat of severe growth abnormalities in the still developing youngsters.

Only as a last resort do surgeons operate on the arthritic joints of children because the intervention could arrest further growth.

For a number of years when a joint-lubricating synovial membrane became very inflamed, it was common practice to remove it (synovectomy), but, Dr. Mills said, "several controlled studies were then done. They showed that when looked at five or so years later the joints that had been operated on were not that much different from those that hadn't undergone surgery."

Some surgeons still see benefits to synovectomies, but the operation is carried out much less often than before.

Total hip joint replacements are becoming more common among children crippled by severely arthritic hips. "Originally, it was thought that an artificial joint might not last more than a couple of years," Dr. Mills commented, "but now the chances appear good for 10 or 15 years' service from a prosthesis before another is needed. Under those circumstances, if a child is very incapacitated or in great pain, the hip joint replacement makes sense."

Braces play a major role in the care of young arthritics. By immobilizing an



Juvenile rheumatoid arthritis impeded development of this teen-ager's teeth and jaw.

inflamed joint, a brace speeds resolution of the inflammatory process and also stabilizes the joint by supporting weakened muscles or ligaments.

Spasms often arise in muscles around painful joints. Hot baths relieve post-rest stiffness, promote relaxation, and facilitate physical therapy when taken immediately afterward. Whether the baths have any remedial effect upon the inflammatory process in joints is still unresolved.

Dr. Mills, an Associate Professor of Medicine at Harvard Medical School, said the most important thing parents can do for an arthritic child is to help him develop as normally as possible.

"This means they should strive to make sure that the child socializes with

his peers, does not fall behind in his education, obtains proper rest and exercise, and takes his medicines regularly," the doctor said. "Admittedly, this will require a lot of time, attention, encouragement, and even ingenuity on the part of the parents."

Thirty years ago, rheumatoid arthritis decimated its young victims. One out of every three died. Deformities predominated among the survivors.

Today, deaths from the disease are extremely rare. As for physical handicaps, Dr. Mills said three-quarters of youngsters with the disorder will emerge from their adolescence in normal health.

A number of years ago, Dr. Mills began treating a 6-year-old girl for the Still's form of rheumatoid arthritis. She was so debilitated, often by temperatures reaching 104°F, that during a four-year period the doctor tended her at her home. She could not travel to his office. Gradually her condition improved.

Eight years passed without further contact with the girl. Then Dr. Mills received a letter from her. He learned that she had recovered fully. What's more, the envelope included a wedding announcement.

"Rheumatic fever, another form of childhood arthritis, is much milder now than it was 30 or so years ago, and nobody knows why," Dr. Mills stated. "We don't know whether rheumatoid arthritis has also become milder or whether the improved outcome for these patients is due in some measure to the generally better health of today's young Americans. The latter could make a difference." ■



The index and middle fingers of this 16-year-old girl's hand are of almost equal length, a result of juvenile rheumatoid arthritis.

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A Little Girl Who Came Back Strong

Kristen Brockmeier of Acton, Mass., turned 4 last month and the Brockmeier home rocked with party gaiety.

As friends joined Kris in playing games, popping balloons, and devouring cake and ice cream, her parents, Jim and Carla Brockmeier, observed the occasion by giving thanks.

Although she appeared the picture of health with her pink-cheeked face and engaging smile framed by long, golden-blond hair, Kris had not reached 4 without a struggle. In fact, at birth she faced overwhelming odds against long-term survival.

Kris was born with at least six abnormalities of the heart, her abdominal organs in reversed position, and an abnormal connection between her food pipe (esophagus) and windpipe (trachea).

The full extent of her difficulties did not become known until after her admission to the MGH's Neonatal Intensive Care Unit at the request of Dr. Gene Swartz of Acton, the family's pediatrician. He asked Dr. Richard R. Liberthson, a pediatric and adult cardiologist, to supervise care of the infant,

then just two days old.

"When a baby turns out to have a reversed or so-called 'mirror image' abdomen but a normally positioned heart, as Kristen had, severe heart abnormalities almost always are present," Dr. Liberthson said. "The chance of total repair is very slim."

Before work on the heart could be undertaken, Dr. Liberthson called on Dr. Samuel H. Kim, a pediatric surgeon, to investigate and eliminate more immediate threats to the baby's life.

Dr. Kim found and severed the abnormal connection (fistula) between the infant's food pipe and windpipe. This link had permitted saliva to enter the windpipe, causing choking, vomiting, and lung irritation.

The principal danger in the abdomen involved the small and large intestines. They were twisted such that gangrene could happen at any moment. Dr. Kim corrected the twisting and "anchored" the intestines to prevent recurrence.

The surgeon praised the services of his anesthesiology team, headed by Dr. John Ryan, pointing out that due to the development of superb pediatric

anesthesia, infant operating procedures are now much safer.

Although Kris was 3 weeks old when Dr. Kim operated, the heart repairs were delayed until she reached 18 months. It was felt her tolerance would be greater.

To define the exact nature of her heart deformities, Dr. Liberthson and Dr. Igor Palacios performed a cardiac catheterization whereby a tube (catheter) was inserted through a blood vessel into the heart for diagnostic tests.

"Although we had a very complex situation, the test information gave us confidence that Kristen's abnormalities were fixable," Dr. Liberthson stated.

With Dr. Edward Lowenstein controlling the anesthesia, a team headed by Dr. Mortimer J. Buckley, Jr., Chief of the Cardiac Surgical Unit, began the repairs.

The primary problem was "tetralogy of Fallot," a combination of four defects originally described by a French physician, Étienne-Louis Fallot. They consisted of a narrowing of the pulmonary artery and valve through which blood flows from the heart's right pumping chamber to the lungs to receive oxygen, an enlarged right pumping chamber, a hole between the latter and the organ's left pumping chamber, and a large, overriding main artery (aorta).

Besides repairing these flaws, the surgeons closed a hole between the heart's two upper chambers, or reservoirs, and redirected pulmonary veins which were delivering newly oxygenated blood to the wrong reservoir.

Kris' recovery was smooth. Today, a happy, healthy tot, she attends nursery school and joins her chums in every kind of childhood activity.

Using a small racket with a sawed-down handle, she is even learning tennis at a club in Acton. Since her parents and sister, Pam, now 7, are well versed in the sport, Kris one day will enable the Brockmeiers to boast a pair of doubles teams. ■



Kristen Brockmeier, after overcoming an almost insurmountable combination of illnesses



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December, 1980

Protecting Life From the Peril of Winter's Freeze

Violence Gives Nation Deeper Scars

Americans live on a violent planet. So far in this century, some 120-million people have died at the hands of other people in wars, revolutions, pogroms—conflicts of every kind.

Although the United States is "at peace," violence within is soaring. Americans commit homicide at a nearly 1,000 percent higher rate than do, for example, the British, Italians, Japanese, and Swedish.

Speaking recently at an MGH medical meeting (Psychiatric Grand Rounds), Dr. Louis J. West, Chairman of the Department of Psychiatry and Behavioral Science at U.C.L.A. School of Medicine, said America is reeling from an epidemic of violence.

"I would estimate that up to half of all violent deaths in this country — homicides, suicides, and fatal accidents — are alcohol-related," he said. "While alcohol may not have the central role in these acts, there is no question that some people deliberately intoxicate themselves to help them give way to destructive impulses. Without the alcohol the violent act might not have taken place."

Dr. West added that recent studies have demonstrated a much stronger link between homicides and suicides than had been thought. A scrutiny of murderers both in the United States and England revealed that a certain number were clearly bent on self-destruction.

Dr. West, who is also Director of U.C.L.A.'s Neuropsychiatric Institute, investigated murderers in American states having the death penalty.

"I found that oftentimes people murdered because they felt it would guarantee their own execution," he said. "A couple of individuals, on failing to get executed after one murder, committed a second in order to force the state's hand."

Dr. West described Gary Gilmore as a classic example of a criminal determined to destroy himself. Convicted of murder in Utah, Gilmore was executed by a firing squad in 1977.

He had been in trouble most of his life and, since his mid-teens, the doctor said, had been almost obsessed with a desire to be shot by a firing

(Continued on Page 4)



As violence increases, fear of it rises, too.

Sixty-eight years ago, a team of British explorers lost a race to become the first men to reach the South Pole.

Navy Captain Robert F. Scott and four companions arrived at the Pole only to discover that nearly a month earlier a Norwegian expedition led by Roald Amundsen had preceded them.

The five-member Amundsen party returned safely over 600 miles to its Antarctic shore base. Continuous gales and subzero cold plagued Scott and his men. They perished from the weather and lack of food.

A detailed account of the ordeal was found eight months later in a diary kept by Scott when searchers came upon his body and those of two companions. The remains were in a tent pitched only 11 miles from where the expedition had stored emergency supplies.

In a part of the world where ice and snow form a year-round mantle, one can comprehend the perils of exposure and inadequate diet. Yet, each winter in many cities and towns of the United States people die from circumstances similar to those which wiped out the Scott party.

Exposed to cold weather, several population groups are particularly prone to hypothermia, a fall of body temperature from the normal 98.6°F to 95°F or below. The potential victims are the very young, the elderly, people with a physical condition which can lead to coma, and those who become hurt and cannot reach help.

Babies are unable to regulate body temperature until they are several months old. In the elderly, the ability to

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EDITORIALS:

Very Uncivilized, Those Indians

Our civilization has soared to new heights. Earthlings have literally left this planet and planted an American flag on the moon. Far beyond the tug of the earth's gravity, American satellites have carried out experiments in the very orbits of other planets. Back on earth we can examine the tiniest microbe. Through recombinant DNA techniques we can change the nature of nature itself. In other advances we can conceive babies in a petri dish and replant severed arms. We can watch a tennis match as it is taking place in Europe or ride a mechanical bucking bull in the local bar. If we're cold, we can dress ourselves in clothing woven by machines using man-made fibers. We now experimentally grow food in the desert or under water. We dwell in buildings that seem to scrape the sky. Is there no end to mankind's ingenuity?

And yet. . . And yet, this same "civilization" drops bombs that kill tens of thousands and devastate whole cities. We live in constant fear of a war that would truly end all wars. In many areas we worry if we have to walk the streets even in daytime. We attend sporting events hoping to see blood and destruction. Sometimes angry fans *cause* the letting of blood and destruction of property. In short, we reside in a world in which hatred often seems to dominate love.

How strange it is, then, that there exist "primitive" societies like the Tarahumaras of Mexico (page 1 article). They enjoy few of the amenities of civilization that we take for granted. No motor vehicles or television. No magnificent dwellings or stadia. No microscopes or telescopes. No advanced industry or agriculture. Yes, the Tarahumaras do lack the perquisites of modern life. And yet. . . And yet, they teach their young how to grow up peaceably with their neighbors. They neither murder others nor kill themselves. They respect life and would consider taking it only in self-defense. Very uncivilized, those Indians.

Allaying Fears Through Knowledge

On page 6 an article describes what we know and do not know about toxic shock syndrome. It is an unusual disease in some respects, a frightening one in others. The full story is not yet in. To date, however, the fast work of the Centers for Disease Control may well have reduced significantly the incidence of a condition that seriously threatens the tiny percentage of women who *are* stricken. By following the guidelines in the article, women may reduce considerably their already low chance of falling victims. Knowing what to do should go far to allay fears.

Body Systems Slow During Severe Cold To Conserve Heat

(Continued from Page 1)

produce body heat diminishes gradually.

Dr. Edward W. Campion, Chief of the MGH Geriatrics Unit, believes that in many ways the 80-year-old is more fragile than the 8-week-old.

"The elderly are often alone," he said, "and isolation can pose a great danger. In dealing with the very old, a physician must diagnose not only the patient's ills but also the environment in which he lives. This is especially important in the light of today's rising heating costs."

Alcoholics are particularly vulnerable in winter to hypothermia because alcohol dilates blood vessels, causing increased loss of heat. By contrast, drinking alcohol in summer makes a person more susceptible to high external temperatures and leads to greater production of body heat.

"In general, the hypothermia patient is someone who for one reason or another is unable to defend his normal body temperature in an environment that is colder than normal for him," said Dr. Peter L. Gross, Associate Chief of Emergency Services at the MGH.

As body temperature slides toward 95, Dr. Gross explained, several reflexes are triggered to try to halt the drop. Shivering, for example, generates heat through contraction of muscles. The cold causes increased constriction of blood vessels near the skin so that warm blood flows mainly in deeper, more critical portions of the body.

From 95° to 90°, shivering stops, and other body processes slow to lessen demands upon the body. The patient is still awake but may become stuporous. At 84° he can become comatose, and his heart may develop an irregular rhythm (fibrillation). The heart may even stop at that point, or it may keep beating until the patient's temperature

Photographs: Pages 1, 3, 4, 5 (upper), courtesy of Boston Herald American; p. 5 (lower), courtesy of Massachusetts Society for the Prevention of Cruelty to Children; p. 6, courtesy of Centers for Disease Control; p. 7, Lawrence Cherkas; p. 8, Myron Daniels.



Although life signs may seem absent in a person exposed to severe cold, a protective effect induced by the cold may mean hope is not lost.

has tumbled to the mid-70s.

"The rate of heat loss is vastly increased if the body is in cold water, as opposed to cold air," Dr. Gross said. "The wintertime water temperature in Boston Harbor falls as low as 33°F. In that kind of exposure severe hypothermia and its complications would set in very quickly."

Treatment at the scene depends on the circumstances prevailing. If the patient were found awake, he would probably be wrapped in blankets, transported to the hospital, and placed under blankets in a warm room to recover slowly over a period of hours.

If, however, the patient's pulse were very faint and blood pressure too low to record, basic life support measures, such as CPR (cardiopulmonary resuscitation), would be undertaken.

Upon the patient's arrival at a hospital, doctors and nurses would employ one or more of a variety of methods to rewarm him, perhaps by introducing warmed solutions intravenously or through special tubes into the abdominal cavity.

In extreme cases, a bypass pump, normally employed in open heart operations, would circulate warm blood through his body.

Treatment in the field requires utmost discretion. Overwarming externally, overresuscitating, and striking the chest too hard to invigorate a heartbeat might produce an abnormal heart rhythm. Even lifting the patient too fast might cause the heart to fibrillate.

In a cold environment, a very slow pulse with perhaps a single breath each minute can sustain life until the

patient reaches the hospital.

"Even if the heart stops, it does not mean that all hope is lost," said Dr. Gross, who is an Instructor in Medicine at Harvard Medical School. "In fact, some of the most dramatic survivals involving CPR have followed immersion in cold water. The coldness has a protective effect upon the body, slowing its metabolism [chemical processes] and minimizing its needs for sustaining life."

Because of this protective effect, even if by all criteria a patient appears dead, resuscitation efforts must continue until body temperature is restored. Then, if there are still no signs of life, the victim can be pronounced dead.

Last March in the *Journal of the American Medical Association (JAMA)*, Drs. Frederick S. Southwick of the MGH and Preston H. Dalglish, Jr., of University Hospital in Boston, reported the treatment of a 48-year-old man who was found in a hallway, his body temperature less than 82°F. Air temperatures ranging down to 3°F had chilled him for 12 hours.

Although the man appeared dead, persistent and highly complex treatment at Boston City Hospital restored a heartbeat after 2 hours and 15 minutes. Body temperature returned to normal 16 hours after hospital admission, and 10 days later the patient went home, fully recovered.

In a September issue of *JAMA*, an MGH team comprised of Drs. Richard S. K. Young (now of Pennsylvania State University Medical School), Ed-

(Concluded on Page 4)

Helping the Elderly to Cope

The nation is entering another winter with energy costly and in uncertain supply.

Public agencies recommend a room temperature of 70°F in homes occupied by the elderly, but with many among this group no longer able to regulate body heat, it is clear that added precautions are needed.

The following measures are recommended for the elderly by Dr. Murray P. Hamlet, Director of the Experimental Pathology and Cold Division at the United States Army's Research Institute of Environmental Medicine in Natick, Mass.:

- Seal all house drafts, i.e. under doors, through windows, etc.

- Wear a warm cap and warm socks in the house, even in bed. Mittens would also be a good idea.

- Eat a nourishing diet that includes warm drinks. Apple cider is popular.

- Consult the family physician about continued use of any tranquilizers or other drugs which might modify temperature regulation to some degree.

- Remain active in the house, if possible, to help the body keep warm.

- Keep a dependable thermometer to check on room temperature. Don't rely on the thermostat alone.

- Arrange for someone or an agency to maintain regular contact with you in the event help may be needed.

Many Murderers Attempt Suicide After Killings

(Continued from Page 1)

squad.

"He left Oregon, which hadn't had the death penalty since 1921, and went to the only state which allows one to elect his type of execution, and where the firing squad is a choice," Dr. West stated.

Gilmore committed a holdup but unlike earlier ones he had staged in which nobody was hurt, he now shot a person who was lying face down on the floor. Before being arrested, Gilmore carried out a second murder. He then pleaded guilty and subsequently opposed attempts to delay his death sentence.

In England, a criminologist, seeking to learn just how strong the link be-

Virtually all crimes of violence are on the increase nationally.



tween homicides and suicides was, studied all of the murders committed in the United Kingdom over a generation. He

discovered that two-thirds of the murderers had made serious suicidal attempts at some time after their convic-

Working in Cold Requires Vigilance

(Concluded from Page 3)

win L. Zalneraitis, and Elizabeth C. Dooling described the neurological outcome of a near drowning episode in Burlington, Mass.

A 7-year-old boy fell into a culvert and was found floating face down in icy water 15 minutes later. Despite CPR, he had no pulse or respiration on arrival at Choate Memorial Hospital in nearby Woburn 25 minutes after immersion. His temperature was 80°F. CPR kept the boy alive until a pulse could be established 2½ hours after the accident. He later was transferred to the MGH for pulmonary and neurological care.

The journal article said the youngster made a slow but steady mental and physical recovery. By eight months after the accident his intellectual abilities had fully returned.

"He's back in school, attending his normal class and making expected progress," Dr. Zalneraitis said in an interview. "The water in which he had fallen was so cold it actually helped him to survive."

Dr. Warren M. Zapol, an MGH anesthetist who directs the hospital's Specialized Center of Research in Adult Respiratory Failure, has been to the Antarctic three times in recent years, and he said, "You spend a great deal of time there teaching people how to avoid hypothermia. One's whole existence in

that region revolves around maintaining body temperature."

Although Dr. Zapol and a group of MGH associates began each trip in October, the Antarctic springtime, the temperature on the frozen continent usually hovered around minus 5°F. With winds clocked often at 30 miles per hour, the chill factor was minus 50°F.

The job of the MGH team was to study Weddell seals and to try to learn

how these air-breathing natives of the Antarctic can remain submerged for as long as an hour and 10 minutes (MGH News, March 1977). Because of the climate, however, the researchers took time to study each other every 10 minutes or so while working outdoors.

"Any white spot on the face could be a first sign of frostbite," Dr. Zapol said. "It meant that individual had to get out of the cold immediately."

"In addition to wearing special clothing, one never traveled anywhere, even a mile away, without a sleeping bag, a tent, and some food. Fatigue and hunger lead to shivering and shaking, a sure signal that the body is shifting into emergency gear to provide needed heat."

In a manual entitled, "Survival in Antarctica," the National Science Foundation warns that a person suffering from hypothermia may be difficult to convince that there is anything wrong. The symptoms—exhaustion, reluctance to carry on, confusion—frequently are mistaken for simple fatigue. People have died of hypothermia without even recognizing the severity of the cold.

"Good physical condition, a proper quantity of nutritional intake, and adequate clothing and shelter defend against hypothermia," the Science Foundation wrote. "Conversely, fatigue, heat loss due to increasing wind speed, wet clothing, inactivity, and lack of adequate energy accelerate hypothermia's effect." ■



Dr. Preston H. Dalglish, Jr., (right) with a patient whose body temperature had fallen to 82°F. Persistent treatment saved the man's life.

tion and that half of the attempts succeeded.

Some people are inclined to think of suicide as a quiet, even peaceful way to end one's existence. "Actually, suicide is a violent, desperate, partly deranged act which often is indistinguishable from murder," Dr. West said. "Sometimes the suicides are even made to look like executions."

In the epidemiology of violence, one can easily overlook the consequences inflicted upon the survivors. A woman who is no longer young and whose spouse dies from an illness, for example, is two to five times more likely to die or at least become ill during the following year than if she had not been bereaved. If the spouse's death results from violence, the risk for the wife is believed to rise.

Dr. West and his colleagues are presently engaged in a study to learn what effect the sight of violence has upon children. Although begun only a few months ago, the study already includes 24 instances of children who witnessed the murder of one parent by another. All took place in the Los Angeles area.

In Dr. West's view, a child exposed to such an experience might grow up regarded by everyone as good, quiet and obedient. Yet, behind the overt behavior could lurk the trauma's real scar tissue, such as a lack of fulfillment of one's potential.

Much has been written about battered, brutalized children (*MGH News*, December 1978). Murder ranks as the fifth most common cause of death of children under age 5. Mothers are more likely to burn or scald the youngsters; fathers, to fracture or smash. Either parent is just as likely to be the offender.

One million episodes of child abuse or neglect are expected to be listed this year, but for every notification 10 violations probably will never be reported.

Dr. West said that study after study has shown that those who are violent, whether toward children or in some other respect, were themselves victims of violence in childhood.

"Go into the individual histories of the murderers, the committers of mayhem, the rapists, those who carry out the most heinous and violent crimes," he said, "and you will find again and again and again that adults treated them brutally and cruelly when they were children, oftentimes before the age of 2."

Before carrying off their loot, thieves who invaded this drug store in Boston went on a smashing spree.



The doctor cited a study conducted among a group of soldiers confined to the army's disciplinary barracks at Leavenworth, Kan. Military police had arrested the men for throwing fragmentation grenades into tents or huts containing other GIs. Of 22 offenders, 21 turned out to have been battered children.

As experts increase efforts to study, understand, and alter the violent ways that make up a significant segment of America's society, there exists a tribe of Indians in the Sierra Madre Mountains of North Central Mexico to whom violence is almost unknown.

The Tarahumara Indians, whose feats of long-distance running are legendary (*MGH News*, April 1977),



No one knows the full extent of child abuse that takes place in the United States each year.

live a seminomadic existence. In constant poverty and confined to a sparse diet consisting mainly of corn, the Tarahumaras see as many as 70 percent of their children die before the age of 6 or 7. But in the wild and primitive region that is their home, there are no police, no soldiers, no jails, no crime, and no delinquency.

The Tarahumaras are virtually non-violent. In the past 50 years, two murders may have taken place among the 50,000 tribal members. In each instance, premeditation proved unlikely.

Suicides among Indians in North America far outstrip the rate among whites, but as far as anybody knows no Tarahumara has ever committed suicide. Their language does not even include a word for taking one's own life.

The poorest people in North America, as Dr. West referred to the Tarahumaras, will not steal because they are too proud.

What creates this nonviolent nature?

"It all comes down to how the children are reared," said Dr. West, who has spent considerable time studying the tribe and its customs. "The Tarahumara Indians never physically punish their children for anything. To inflict pain upon a child or to threaten to do so is beyond the tribe's comprehension.

"If a child does something wrong, and it does happen, others will just stare at him, perhaps even laugh, and the child will finally hang his head in shame. You just know that the youngster will never commit that wrong again. Shame is a much more powerful extinguisher of undesired behavior in children than punishment." ■

Cutting the Risk of Toxic Shock Syndrome

A sudden awareness that a hygienic practice of long standing is associated with a potentially fatal disease can understandably be frightening. Nevertheless, the tampon scare which has distressed millions of women seems to be abating.

Thanks to public service announcements by government health officials as well as those concerned with the manufacture of tampons, more and more women are realizing that they can minimize, and apparently even avoid, the risk of contracting the illness known as toxic shock syndrome (T.S.S.).

"Tampons do not cause the syndrome but are clearly associated with it," said Dr. Kathryn N. Shands, Chief of the Toxic Shock Syndrome Task Force at the federal Centers for Disease Control (C.D.C.) in Atlanta.

She said the disease, which has struck 629 people and caused 60 deaths since 1975, stems from an unidentified toxin produced by a common form of bacteria called *Staphylococcus aureus*.

At least 10 laboratories around the country are hard at work trying to isolate the toxin and to determine how tampons are involved.

T.S.S. primarily affects young women during their menstrual periods. It is marked initially by a fever of at least 102°F, vomiting or diarrhea, and a rapid drop in blood pressure, leading to shock; thus the name toxic shock syndrome.

These symptoms are accompanied by a sunburnlike rash similar to one

appearing on a patient with scarlet fever. In T.S.S., the skin rash later peels, particularly from the palms of the hands and soles of the feet.

Initial data gathered by the C.D.C. earlier this year indicated that the illness would annually strike 3 of every 100,000 menstruating women. Today, that estimated ratio has risen to between 6 and 15 per 100,000.

"A woman is still far safer wearing a tampon than driving a car," said Dr. Shands. "But if women decide to go on using tampons, they should know what the symptoms of the illness are.

"If a woman develops a high fever and diarrhea or vomiting while wearing a tampon, that should be enough inducement for her to remove it and consult a physician. She should not wait for further symptoms."

In a telephone interview, Dr. Shands said that menstruating women in the general population who prefer to use tampons may choose to wear the product only part of the time; using tampons during the day, for example, and sanitary napkins at night.

The federal Food and Drug Administration points out that women can almost entirely avoid the low risk of contracting the syndrome by not using tampons at all.

Tampons came into question because of studies conducted by the Wisconsin State Department of Health and Social Services, the Utah State Department of Health, and the C.D.C.

The C.D.C. found that of 50 women who developed T.S.S. during their menstrual period, all used tampons. Thirty of thirty-one patients studied by the Wisconsin group used tampons. Utah reported all of 12 patients studied wore them.

In a second study, the C.D.C. found that more than two-thirds of the patients it queried had used the Rely brand of tampon. As a result, pending further investigation, Procter and Gamble, the manufacturer, voluntarily removed its super absorbent tampon from sale.

In the October 9th issue of the *New England Journal of Medicine*, four MGH physicians addressed themselves to the controversy. They were Drs. Arlan F. Fuller, Jr., of the Vincent Memorial Hospital, the Gynecological Service of the MGH; Morton N. Swartz, Chief of the MGH Infectious Disease Unit; John S. Wolfson, of In-

Trained at the MGH

Dr. Kathryn N. Shands, who leads the federal government's investigation of toxic shock syndrome, has had a long association with the MGH.

Upon graduation from Cornell University, she worked full time in 1968 and 1969 as a writer in the MGH News Office. After obtaining an M.D. degree from Boston University, she returned to the MGH in 1977 as an intern. She completed her residency in 1979 before going to the Centers for Disease Control in Atlanta as an Epidemic Intelligence Service Officer.

fectious Disease; and Ronnie Salzman, of the Vincent Memorial.

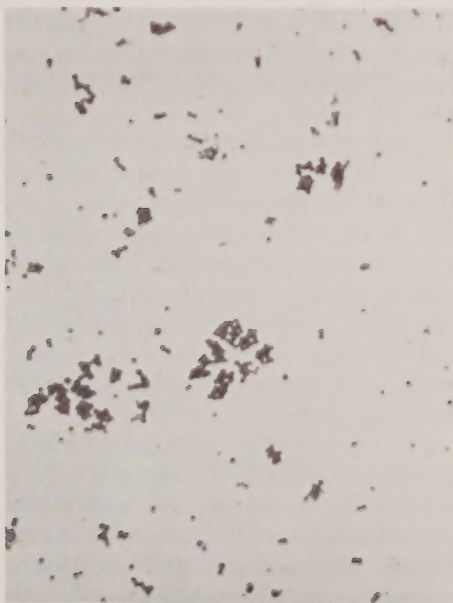
"We propose," they wrote, "that toxic shock syndrome is caused by the reflux [reverse flow] of toxin-containing menstrual blood from the vaginal canal, through patent [open] fallopian tubes, into the peritoneal [abdominal] cavity, where the toxin can be rapidly absorbed. This sequence of events would be promoted by the combination of bacterial colonization (e.g., by *Staph. aureus*) and occlusion [blocking] of the vaginal outlet by a tampon."

The physicians went on to write that the appearance of the toxic shock syndrome in recent years may be related to a change in tampon design and composition. While cotton tampons also used to be inserted into the vagina, they wrote, newly introduced devices have been designed to expand severalfold and block the outlet of the vagina.

How the bacteria enter is not known. And where they originate in the environment is unknown. Dr. Fuller also pointed out in an interview that *Staphylococcus aureus* comes in a number of forms; only a few may produce the toxin.

The C.D.C. has established very strict criteria for defining an episode of toxic shock syndrome. In addition to the symptoms already listed, at least three organ systems have to be involved.

During a recent lecture at the MGH to members of the Children's Service, Dr. Shands said T.S.S. patients frequently suffer such muscle pain that they are unable to raise their arms or legs. Severe liver or kidney abnormalities may develop. Blood clotting disorders may occur, and even a serious decrease in the patient's level of consciousness.



Microscopic view of clusters of *Staphylococcus aureus*, the bacteria involved in toxic shock syndrome.



Holding a human brain, Dr. Edward P. Richardson, Jr., discusses various aspects of brain degeneration at a meeting with colleagues in the MGH Neurology Service.

Senility at Middle Age? It Happens

Why do some people grow old before their time?

Senility is defined as "the physical

Considerable swelling (edema) may accompany the rash, which usually appears about 10 days after the illness begins. After a while the rash also tends to change in character, taking on the look of a drug-induced eruption.

The Children's Service had occasion to diagnose and treat a T.S.S. patient a few months ago. Another hospital transferred a very sick 17-year-old girl to the MGH with what was described as a kidney inflammation due to bacterial infection (pyelonephritis). An MGH resident recognized the symptoms as those of T.S.S. The physicians treated the patient accordingly, and she recovered.

Dr. Shands pointed out that most T.S.S. patients spend between three and five days in a hospital intensive care unit (I.C.U.), then another three days to a week in a nonintensive care bed before they go home. Fluid replacement plays a key role in the treatment. Usually the patient also receives an antibiotic to combat the bacteria. Some patients need the assistance of a respirator.

About a third of the T.S.S. patients studied have had recurrences. Generally, they have been less severe than the initial episode, but on a number of occasions, patients have been admitted to an I.C.U. more than once. ■

and mental deterioration associated with old age." Yet, senility is not exclusively a characteristic of advanced years.

The National Institute on Aging estimates that 50 to 60 percent of all elderly persons with mental impairment have an illness called Alzheimer's disease. Unlike other conditions which lead to senility, however, Alzheimer's also strikes people in the prime of life, people as young as 40.

The disorder primarily involves the "thinking" portion of the brain. Severe memory loss, including disorientation and even inability to recognize a family member, develops first. Parts of the brain having to do with moving, feeling, seeing, and hearing tend largely to escape until the disease has progressed for several years.

Psychiatrists and neurologists, who often work hand in hand in caring for Alzheimer's disease patients, sometimes disagree with colleagues on the status of the malady. Some health professionals break it down into two categories: senile dementia and presenile dementia.

"As far as one can tell they involve basically the same disease process," said Dr. Edward P. Richardson, Jr., an MGH neurologist and neuropathologist. "Both share the same kind of nerve-cell changes and derive their symptoms from actual loss of brain tissue. The major distinction is that presenile dementia strikes at an earlier age."

What causes Alzheimer's, no one can

say. And there is no known treatment. But more research on the disease is being carried out today than ever before. The National Institute of Neurological and Communicative Disorders and Stroke as well as the National Institute on Aging help to underwrite many of the studies.

The disease was first described early in the century by Dr. Alois Alzheimer, a German psychiatrist and neuropathologist. He wrote about a 56-year-old woman who had undergone enormous alterations of intellect and behavior and who subsequently died in a state of great debility.

Examination of the patient's brain revealed an abnormal accumulation of fibrous material within nerve cells. The excessive material appeared to be associated with actual destruction of the cells.

The disclosure of the nerve-cell alterations and the fact that the disorder could affect people *before* old age greatly impressed Munich's Dr. Emil Kraepelin, one of the world's leading psychiatrists. He coined the term, Alzheimer's disease.

Diagnosing the illness requires an expert. Mental confusion arises from many afflictions that are treatable, such as an underactive thyroid, a brain tumor, a vitamin B-12 deficiency, enlargement of fluid chambers in the brain (normal pressure hydrocephalus), or a blood clot resulting from an already forgotten blow to the head.

Additionally, is the patient suffering from dementia, a decline from previously attained intellectual skills, or simply from depression?

In making his initial diagnosis, the doctor leans heavily on information from a source close to the patient, usually a family member. How severe is the memory loss? Does the patient have difficulty recognizing relatives and close friends? Is he unable to accept responsibility? Does he wander aimlessly? Might he turn gas jets on and forget to turn them off?

"The clinical assessment depends on determining the presence of what appears to be an irreversible intellectual deficit," Dr. Richardson said. "That determination can be aided by X-ray techniques."

At one time, the common practice was to inject air into fluid spaces of the brain and then obtain a special X ray (pneumoencephalogram) of the structure to show possible wasting of tissue.

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Alzheimer's Disease Spurs Major Studies

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The procedure, however, can be very uncomfortable, often giving rise to nausea and headaches lasting for several days.

Dr. Richardson said pneumoencephalograms are seldom ordered these days because a newer technique called computed tomography (CT scanning) provides the same needed information without causing any discomfort whatever.

As the disease progressively destroys more and more nerve cells, the loss of tissue irreversibly shrinks the brain and makes it lighter.

In studying Alzheimer's disease, investigators have wondered whether it may be inherited. Dr. Richardson, who is a Professor of Neuropathology at Harvard Medical School, said the illness seems to occur sporadically in the population although evidence indicates that perhaps seven percent of the patients may have a familial form of the malady.

He added that individuals stricken with Down's syndrome (mongolism) seem predisposed to have Alzheimer's at a very much earlier age than the general populace.

Also, nerve-cell changes similar to those of Alzheimer's occur in widespread fashion among Chamorro natives in Guam and a few other small populations in the far Pacific, as well as in a small group living in Japan.

Dr. Richardson said that epidemiologic studies indicate that the illness in the Pacific area is not a true hereditary disorder but may stem from some kind of common environmental exposure.

In addition to discussing the possibility of heredity, researchers have wondered whether some virus may cause Alzheimer's.

There is good reason for such consideration. A viruslike agent is known

to transmit Creutzfeldt-Jakob disease, a disorder which attacks the brain and generates devastating mental changes. So far, however, a search of brain tissue affected by Alzheimer's has not clearly revealed anything which can be regarded as transmissible.

A clue to possible treatment: Some studies indicate that Alzheimer's may cause a loss of specific transmitter substances needed in the brain. Finding a replacement someday might provide an effective treatment. In Parkinson's disease, for example, it is often possible to correct movement disorders by employing certain drugs to assist natural substances which the body is not making in adequate amounts. The Alzheimer's work remains experimental at this time.

At a psychiatric division of the MGH, McLean Hospital in Belmont,



Dr. Dennis M. Landis, Chief of the MGH Neurocytology Laboratory, prepares to use an electron microscope to look for changes in the structure of brain nerve cells that would identify Alzheimer's disease.

Mass., Dr. Dennis J. Selkoe, a neurologist and neuropathologist, directs a research group seeking to learn how Alzheimer's works. What exactly is the fibrous material found in nerve cells and what is the mechanism that increases the amount of the substance?

"If we had the answers to these questions," Dr. Selkoe said, "we could then be on the road toward learning what conditions might possibly prevent the fibrous material from accumulating."

Neurologists and psychiatrists at McLean see individuals with Alzheimer's disease principally on an outpatient basis, but often they are first cared for as inpatients.

Dr. Selkoe explained that in addition to ascertaining the presence of Alzheimer's, it is important to determine whether depression is even a partial component of the overall illness.

"We often find an element of depression," the doctor said. "By administering certain antidepressant drugs, we may be able to improve the patient's sense of well-being. This, however, would not lessen the basic memory loss which is the hallmark of Alzheimer's."

The role of the psychiatrist is particularly important in certain stages of Alzheimer's when the patient may become very disturbed. In addition to medication for relaxing, the psychiatrist can suggest to the family daily routines, physical activities, and social contacts that will keep the patient occupied.

"Many people assume that becoming senile is simply a part of getting old," said Dr. Selkoe, who is also an Assistant Professor of Neurology at Harvard Medical School. "The fact is that Alzheimer's disease is the most common cause of brain degeneration; three times as common as Parkinson's disease and 15 times as common as multiple sclerosis. With the help of both governmental and private funding, the neurological sciences are focusing very intensely on solving the mystery surrounding Alzheimer's disease." ■